



# DEPARTMENT OF CITY PLANNING

100 LARKIN STREET · SAN FRANCISCO, CALIFORNIA 94102

## = FINAL ENVIRONMENTAL IMPACT REPORT = 180 MONTGOMERY STREET

CASE NUMBER EE 76.162

CERTIFIED

July 28, 1977

DEPARTMENT OF CITY PLANNING  
SAN FRANCISCO

D  
REF  
711.4097  
On197f



**5/S**

**SAN FRANCISCO  
PUBLIC LIBRARY**

**REFERENCE  
BOOK**

**Not to be taken from the Library**



3 1223 03629 9049



# DEPARTMENT OF CITY PLANNING

100 LARKIN STREET · SAN FRANCISCO, CALIFORNIA 94102

## FINAL ENVIRONMENTAL IMPACT REPORT

180 MONTGOMERY STREET

CASE NUMBER EE 76.162

Certified

July 28, 1977

DEPARTMENT OF CITY PLANNING  
SAN FRANCISCO

FINAL EIR REFLECTS CHANGES MADE IN RESPONSE  
TO COMMENTS RECEIVED IN PUBLIC HEARING.

D REF 711.4097 On197f

180 Montgomery Street :  
final environmental  
1977.

S.F. PUBLIC LIBRARY

3 1223 03629 9049

SAN FRANCISCO  
CITY PLANNING COMMISSION  
RESOLUTION NO. 7778

WHEREAS, A draft environmental impact report, dated May 12, 1977, has been prepared by the Department of City Planning in connection with EE76.162: 180 Montgomery Street Office Building, on the property described as follows:

Southeast corner Montgomery and Bush Streets; Lots 6A, 6B and 6C in Assessor's Block 289;

and

WHEREAS, The Department duly filed a notice of completion of the draft report with the Secretary of the California Resources Agency, gave other notice and requested comments as required by law, made the report available to the general public and satisfied other procedural requirements; and

WHEREAS, The City Planning Commission held a duly advertised public hearing on said draft environmental impact report on May 12, 1977, at which opportunity was given for public participation and comments; and

WHEREAS, A final environmental impact report, dated July 28, 1977, has been prepared by the Department, based upon the draft environmental impact report, any consultations and comments received during the review process, any additional information that became available, and a response to any comments that raised significant points concerning effects on the environment, all as required by law; and

WHEREAS, On July 28, 1977, the Commission reviewed the final environmental impact report, and found that the contents of said report and the procedures through which it was prepared, publicized and reviewed comply with the provisions of the California Environmental Quality Act, the Guidelines of the Secretary for Resources and San Francisco requirements;

THEREFORE BE IT RESOLVED, That the City Planning Commission does hereby find that the Final Environmental Impact Report, dated July 28, 1977, concerning EE76.162: 180 Montgomery Street Office Building is adequate, accurate and objective, and does hereby CERTIFY THE COMPLETION of said Report in compliance with the California Environmental Quality Act and the State Guidelines;

AND BE IT FURTHER RESOLVED, That the Commission in certifying the completion of said Report does hereby find that the project as proposed will not have a significant effect on the environment.

I hereby certify that the foregoing Resolution was ADOPTED by the City Planning Commission at its regular meeting on July 28, 1977.

Lynn E. Pio  
Secretary

AYES: Commissioners Bierman, Lau, Rosenblatt, Wentz  
NOES: Commissioner Starbuck  
ABSENT: Commissioners Boas, Dearman  
PASSED: July 28, 1977

## TABLE OF CONTENTS

	<u>Page</u>
List of Tables	vi
List of Figures	vii
I. SUMMARY	1
II. PROJECT DESCRIPTION	5
A. OBJECTIVES OF DEVELOPMENT	5
B. LOCATION AND BOUNDARIES	5
C. DESCRIPTION OF THE PROPOSED PROJECT	5
III. ENVIRONMENTAL SETTING	23
A. EXISTING BUILDINGS	23
B. SCENIC AND HISTORICAL ASPECTS	31
C. TOPOGRAPHY, GEOMORPHOLOGY, DRAINAGE, SEISMICITY	33
D. OTHER PROJECTS IN AREA	36
E. LAND USE AND OFFICE SPACE DEMAND	37
F. TRANSPORTATION AND CIRCULATION	40
G. AIR QUALITY	52
H. CLIMATE	55
I. BIOTA	55
IV. ENVIRONMENTAL IMPACT	57
A. SEISMIC HAZARD	57
B. HISTORICAL, CULTURAL, ARCHAEOLOGICAL, ARCHITECTURAL, AND SCENIC ASPECTS	57
C. LAND USE	60
D. ECONOMIC	62
E. POPULATION	66
F. PUBLIC REVENUES	66

TABLE OF CONTENTS (continued)

	<u>Page</u>
G. TRANSPORTATION AND CIRCULATION	67
H. AIR QUALITY	81
I. MICROCLIMATE	84
J. NOISE AND VIBRATION	85
K. BIOTA	87
L. ENERGY USE	87
M. WATER USE	88B
N. SURFACE AND GROUND WATER	92
O. LIQUID WASTES	92
P. SOLID WASTES	94
Q. POLICE	95
R. FIRE PROTECTION	95
V. MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT	97
A. SEISMIC HAZARD	97
B. HISTORICAL AND ARCHAEOLOGICAL IMPACTS	97
C. SCENIC, ARCHITECTURAL AND LAND USE IMPACTS	98
D. TRANSPORTATION AND CIRCULATION	100
E. AIR QUALITY	100
F. MICROCLIMATE IMPACTS	101
G. NOISE IMPACTS	102
H. BIOTA	102
I. ENERGY USE	103

TABLE OF CONTENTS (continued)

	<u>Page</u>
VI. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED	105
VII. ALTERNATIVES TO THE PROPOSED ACTION	107
A. SITE ALTERNATIVES	107
B. USE ALTERNATIVES	108
C. DESIGN ALTERNATIVES	110
D. NO PROJECT ALTERNATIVES	112
VIII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY	115
IX. ANY IRREVERSIBLE CHANGES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED	117
X. THE GROWTH INDUCING IMPACT OF THE PROPOSED ACTION	119
XI. ENVIRONMENTAL IMPACT REPORT AUTHORS AND PERSONS CONTACTED	121
XII. DISTRIBUTION LIST	I
XIII. COMMENTS AND RESPONSES	A
APPENDIX A - BIBLIOGRAPHY	125
APPENDIX B - FLOOR AREA RATIO (FAR) AND BONUS AREA CALCULATIONS	127
APPENDIX C - COMMENT ON THE ARCHITECTURAL SETTING OF THE BUSH-MONTGOMERY STREET INTERSECTION BY THE FOUNDATION FOR SAN FRANCISCO'S ARCHITECTURAL HERITAGE	129
APPENDIX D - TRANSPORTATION	131
APPENDIX E - AIR QUALITY CALCULATIONS FOR EXISTING CARBON MONOXIDE CONCENTRATIONS	137
APPENDIX F - MICROCLIMATE IMPACT ANALYSIS FOR THE PROPOSED MONTGOMERY-BUSH HIGH-RISE BUILDING	153
APPENDIX G - ENERGY CONSUMPTION ASSUMPTIONS AND CALCULATIONS	187

## LIST OF TABLES

<u>Table No.</u>		<u>Page</u>
1	Approximate Building Areas and Dimensions	13
1A	Approximate Building Areas and Dimensions	14A
2	Tentative Project Schedule	20
3A	Patronage/Capacity Profiles for Muni Lines Serving the Site of Proposed Project (A.M. Peak Hour)	42
3B	Patronage/Capacity Profiles for Muni Lines Serving the Site of Proposed Project (P.M. Peak Hour)	43
4	Traffic Counts for Montgomery Street and Bush Street 4:30 P.M. to 5:30 P.M.	50
5	Demographic Characteristics of Downtown Office Building Workers	61
6	Residential and Individual Income Distribution of Employees of Proposed Building	66
7	Existing Assessed Valuation of Land and Improvements On Site	67
8	Place of Residence and Modal Split of Employees Added by Proposed Project	69A
9	Transit/Non-Transit Split of Proposed Building and Buildings Planned and Under Construction Within a Two-Block Radius of Bush and Montgomery Streets	70
10	Estimated Increases in the Existing East Side of Montgomery Street Sidewalk South of the Site Pedestrian Flow: If Project Were Built	78
11	Estimated Vehicle Miles	81
12	Estimated Daily Vehicle Emissions Generated by the Project	82
13	Floor Area Ratio and Bonus Area Calculations	127
14	On-Street Parking and Parking Zone Conditions Vicinity of Bush and Montgomery	131

## LIST OF FIGURES

<u>Figure No.</u>		<u>Page</u>
1	Projected Project Site	6
2	Location Map	7
3	Ground Floor Plan	8
3A	Revised Ground Floor Plan, 31-Story Building	8A
3B	Revised Ground Floor Plan, 25-Story Building	8B
4	Typical Low-Rise Floor Plan	10
5	Typical High-Rise Floor Plan	11
6	Zoning for Site	16
7	Elevation, Montgomery Street	17
8	Section	18
9	Project Setting, with Building Heights	24
10	Existing E.F. Hutton Building	25
11	Bush Street View of Existing Buildings	27
12	Montgomery Street View of Existing Buildings	29
13	Transit Services in Vicinity of Proposed Building	41
14	Designated Transit Preferential Streets	46
15	Designated Major Thoroughfares	47
16	Existing Street Network	49
17	Off-Street Parking	51
18	Anticipated Daily and Annual Load Distribution	89
19	Daily Fuel Oil Distribution Curve	90
20	Annual Fuel Oil Distribution Curve	91
21	Tow-Away Zones in the Vicinity of Montgomery and Bush Streets	134

LIST OF FIGURES (continued)

<u>Figure No.</u>		<u>Page</u>
22	Streets Designated as Bicycle Routes	135
23	Peak Hour Vehicle Counts	138
24	Carbon Monoxide Concentrations Assuming BAAPCD 1980 Emissions Factors and Typical Case Air Stability Conditions	146
25	Carbon Monoxide Concentrations Assuming BAAPCD 1980 Emissions Factors and Worst Case Air Stability Conditions	147
26	Carbon Monoxide Concentrations Assuming EPA 1972 Emissions Factors and Typical Case Air Stability Conditions	148
27	Carbon Monoxide Concentrations Assuming EPA 1972 Emissions Factors and Worst Case Air Stability Conditions	149







## I. SUMMARY

Corwin Booth and Michael T. Hall propose to develop a high-rise office building on the southeast corner of Bush and Montgomery Streets. The building would consist of a lobby/retail/plaza ground floor level below a 23 29 25- to 28-story<sup>1</sup> office tower. The building would provide approximately 349,000 net square feet of rentable office space and 4120 net sq ft of retail space; total gross occupied building area (excluding mechanical service floors) would be approximately 382,000 sq ft.

PUBLIC SPACE  
266,000 to  
4000 to 10,000  
342,000 to

WITH 349,000 SQUARE FEET OF OFFICE SPACE  
Population of the building is estimated at between 1360 and 2360.  
The developer's marketing intent and present tentative tenant commitments indicate the occupants would tend to be smaller professional firms active in the central finance and administrative district.

The project would take approximately 20 months to construct, and is expected to be completed during late 1979. It would require demolition of existing structures on the three assembled lots of the site. ON THE 19 FLOOR WITH THE STANDARD OIL BUILDING ADJACENT WOULD REQUIRE A CONDITIONAL USE PERMIT. The proposed building would be located in the core area of the finance and administrative district of San Francisco's downtown area. This is an area already characterized by existing high-rise office buildings, and continued development of new buildings. The proposed project would be part of this general trend in the finance and administrative district, as is the First California Bank Building (under construction) and the proposed 595 Market Street Building (approved by project uncertain).

---

1. Ultimate height is not presently determined, but impacts are calculated for a 29-story building as a conservative analysis.

The proposed project would be expected to have the following impacts on its natural and human environmental setting:

- Land Use The office space that would be added to the downtown inventory by the project would meet an existing demand without adversely affecting the general market condition for office space of this category.
- Economic The approximately 1360 to 2360 persons that would be occupying the proposed building would represent an increase in downtown office-related employment. Approximately 220 person-years of construction labor would be required to build the project.
- Public Revenues The assessed value of the site and its buildings would increase from \$930,000 existing, to \$5,050,000 proposed, resulting in additional property tax revenues. Additional business and sales tax revenues would be proportionate to the extent this project represents growth in downtown activity.
- Public Services Demand for fire, police, utility, and waste services would be increased by this building.
- Transportation Home/work travel by occupants of the proposed office building are estimated at 1241 vehicle round trips per day by private auto and 984 person round trips per day by public transit in 1980. Traffic count data indicate this would increase flow as a percent of capacity by approximately 5%. The resulting increased transit ridership would not cause any system to exceed its projected capacity. However, without schedule changes, particularly the case with Muni, individual

- lines would exceed their capacities during peak periods.
- During the 20-month construction period the curb lane of both Montgomery and Bush streets would be closed, and the sidewalks relocated under cover.
- Pedestrian Circulation      The project would add to the daytime population of the downtown area, which would result in no change in the level of service on the Bush Street sidewalk, but which could result in a reduction in the level of service on the Montgomery Street sidewalk.
  - Micro-climate      The effect on street level winds and comfort would vary with location near the project; winds would be increased close to the site but would decrease along Montgomery Street. Added to increased wind force would be increases in areas in shadow that would result in decreased comfort for pedestrians. The proposed plaza area would be totally in shadow and exposed to winds.
  - Historical and Visual      The site now contains three low buildings which contribute to the visual and historical character of the finance and administrative district, particularly the neoclassic style E.F. Hutton Building. These buildings would be demolished. Their replacement by a single office tower in conventional contemporary design idiom would change urban scale and character at the site.
  - Noise and Vibration      During demolition and construction, some discomfort would occur for pedestrians and occupants of nearby buildings from the operation of construction equipment.

Measures adopted to mitigate potential impacts include a decision not to provide auto parking in the building in order to discourage private auto use and generation of air pollutants, increasing the width of sidewalks at the site to accommodate increased pedestrians, the placement of this additional sidewalk area and roughly one-third of the plaza area under cover to shield it from the wind, and the selection of a variable volume air handling system with economizer cycle. Department of Public Works requirements concerning traffic, air pollutants, and noise impacts of construction would be observed, and any special problems will be worked out with the Department.

Alternative sites for the proposed building are limited to the core finance and administrative district by the developer's objective of meeting office space demand in that area. Sites elsewhere would have to be developed in response to different market forces. Alternative sites within the area are limited, and would have impacts similar to the proposed project. The proposed site is presently developed for primarily office uses, with some retail.

## II. PROJECT DESCRIPTION

### A. OBJECTIVES OF DEVELOPMENT

25- 31-

Corwin Booth and Michael T. Hall propose to develop a 26- to 29-story office building at 180 Montgomery Street. The objectives sought by the proposed project are to meet demand for professional office space in the finance and administrative district<sup>1</sup> and thereby to maximize financial return on the investment in the proposed project and property.

### B. LOCATION AND BOUNDARIES

The proposed project occupies the southeast corner of Montgomery and Bush Streets, in the area generally referred to as the finance and administrative district within the central business district (CBD) of the City of San Francisco. The property consists of lots 6A, 6B, and 6C in Assessor's Block 289, and totals 18,580 sq ft in area (see Figure 1). The location within the downtown area is shown in Figure 2.

### C. DESCRIPTION OF THE PROPOSED PROJECT

23  
The proposed building is a high-rise office tower between 25 and  
29 1 OR 2 LEVEL  
28 floors above a single ground floor of lobby and retail space. SEE INSERT FOLLOWING

The proposed ground floor plan, shown in Figure 3, has a gross enclosed area of approximately 5900 sq ft. This includes a lobby area of approximately 750 net sq ft and two separated retail spaces of

---

1. The finance and administrative district is the area roughly bounded by Market, Powell, and Sacramento Streets. For a map and further description of this subarea, see Arthur D. Little, Inc., Commercial and Industrial Activity in San Francisco: Present Characteristics and Future Trends, (a report to the San Francisco Planning Department), June 1975, p. IV-56, Figure IV-5.

INSERT ON PAGE FIVE

The design originally proposed by the developer is shown in Figures 3 through 8 on pages 8 through 18. The developer anticipated that he would be allowed under the City Planning Code to build to a gross area of approximately 386,000 square feet. However, approximately 39,000 square feet of this building area is dependent upon City approval of a public plaza proposed by the developer on the site. The Zoning Administrator and Planning Department staff have reviewed the design of the proposed building and plaza, and have questioned whether the plaza as designed is satisfactory to the intent of applicable ordinances.

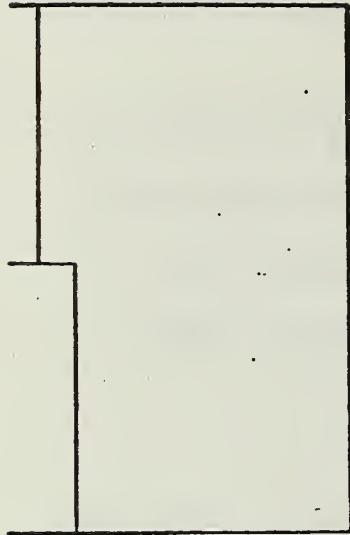
As no formal determination will be made prior to certification, the Draft EIR identified the characteristics of the proposed project as between 26 and 29 stories high, and between 342,000 and 382,000 square feet in area. The discussions conducted between the developer and City Staff concurrent with review of the Draft EIR and further additional design of the project have resulted in design modifications intended as measures to mitigate impacts. At the time of Final EIR preparation, design of the building ground floor and plaza is as shown on Figure 3A. Width of the office tower was reduced approximately 5 feet, and height of the building consequently increased to 31 stories to accommodate the same anticipated allowable floor area.

If agreement concerning plaza design and approval for bonus building floor area cannot be achieved, the suggested plaza area may instead be developed as a two level retail and office extension of the building. This would result

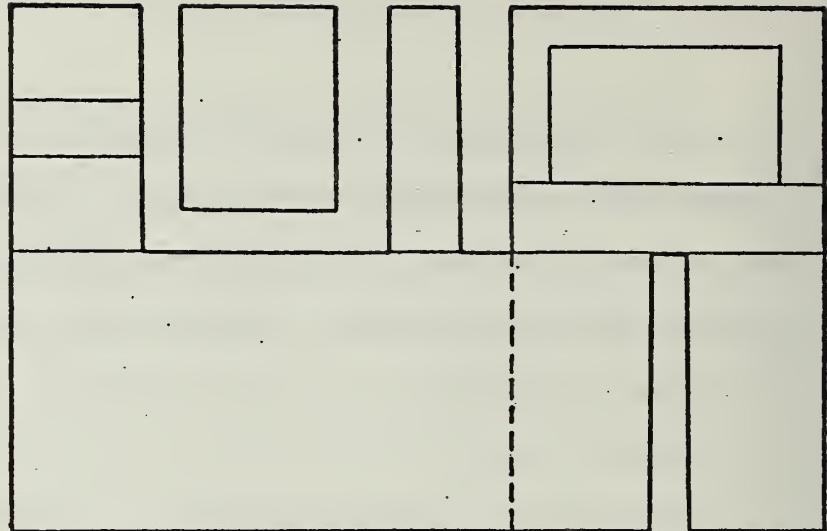
INSERT (CONTINUATION OF INSERT TO PAGE 5)

in a design providing approximately 12,000 net square feet retail space (roughly 8000 square feet more than the building initially proposed) and 263,000 net square feet office space (roughly 86,000 net square feet less than initially proposed). The building would thereby be reduced to 25 stories in height.

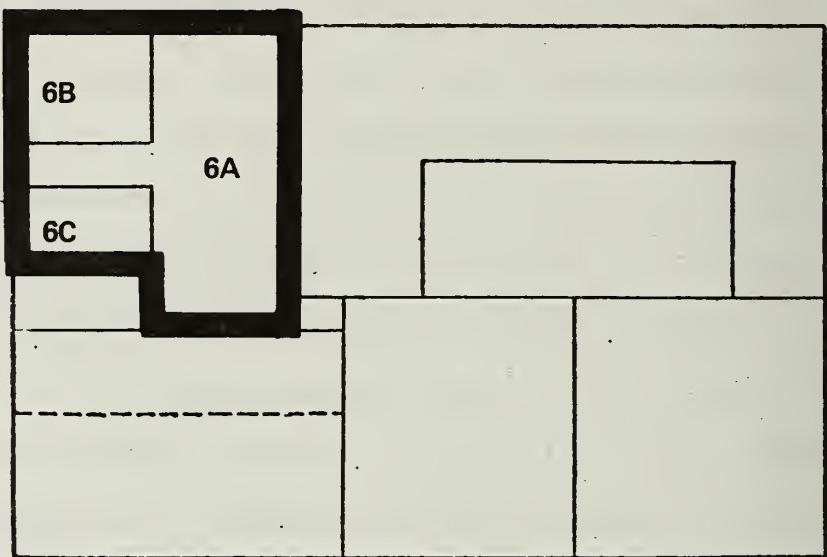
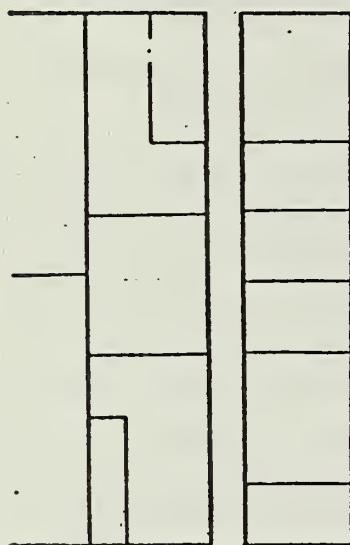
Impacts of the proposed project were analyzed on a "worst case" basis in the EIR, assuming a 29-story building of 382,000 square feet gross with the plaza space as initially proposed. Improvements to plaza design are discussed under mitigating measures. Differences in impact are identified where pertinent in Chapters IV and V.



MONTGOMERY



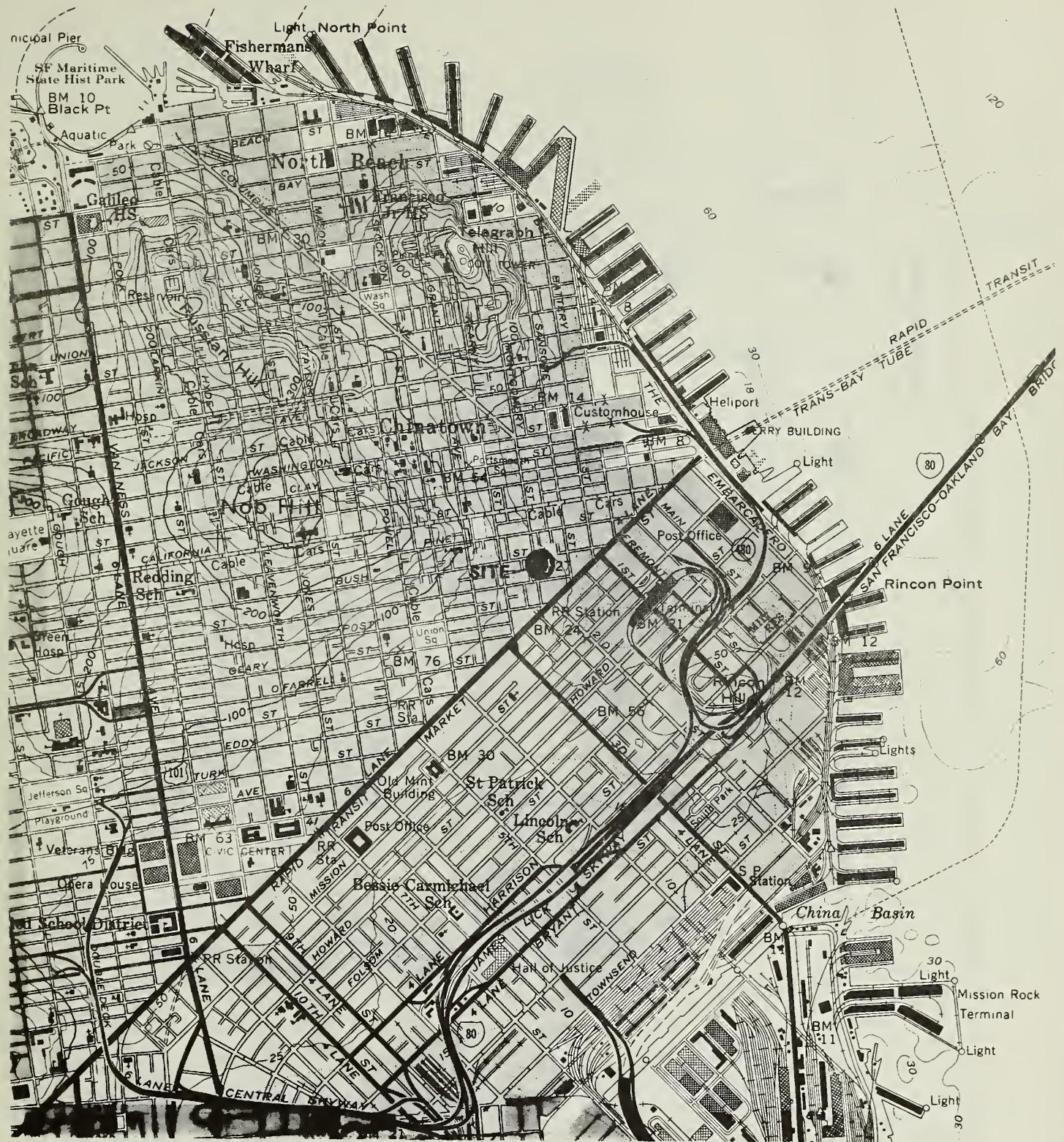
BUSH



SUTTER

N  
↗

FIGURE 1 PROJECTED PROJECT SITE  
(Lots 6A, 6B, and 6C in  
Assessor's Block 289)



SCALE 1:24000

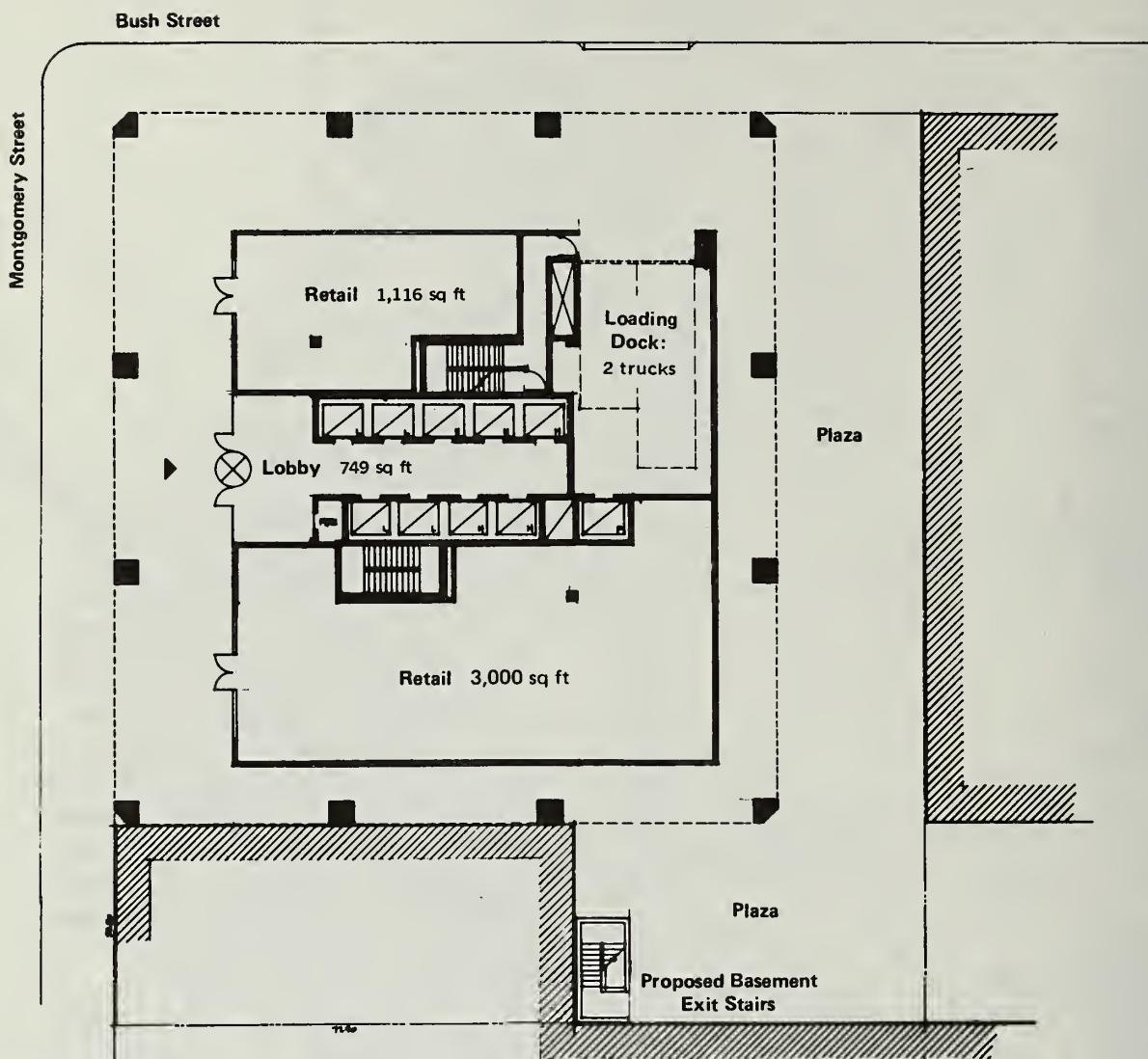
1       $\frac{1}{2}$       0      1 MILE

1000    0    1000    2000    3000    4000    5000    6000    7000 FEET

1      5      0      1 KILOMETER

Source: U.S. Geological Survey, N3745-W12222.5/7.5, 1956, Revised 1968 and 1973.

FIGURE 2 LOCATION MAP



Source: Skidmore, Owings & Merrill, Architects-Engineers.

FIGURE 3 GROUND FLOOR PLAN

MONTGOMERY STREET

BUSH STREET

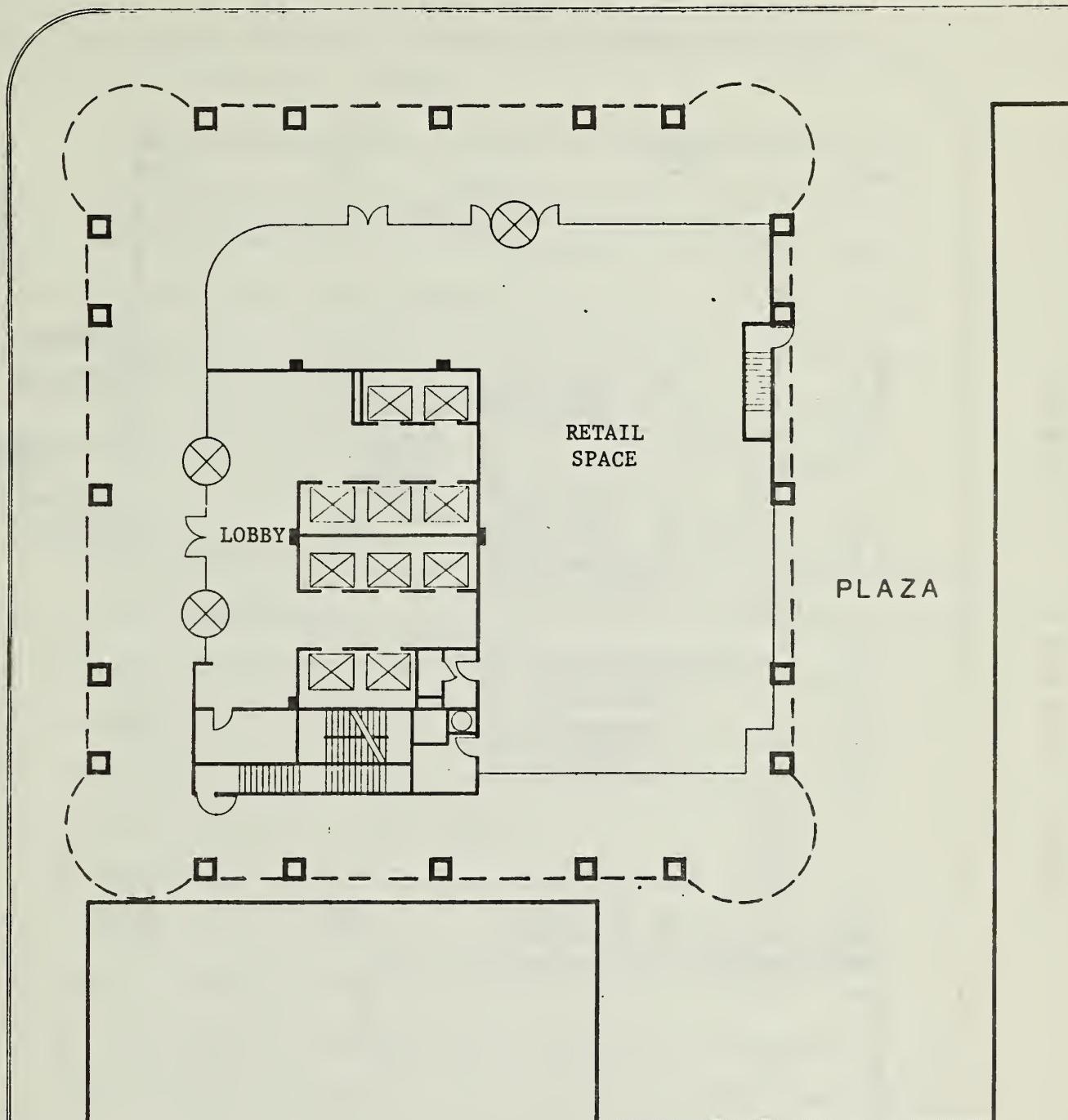
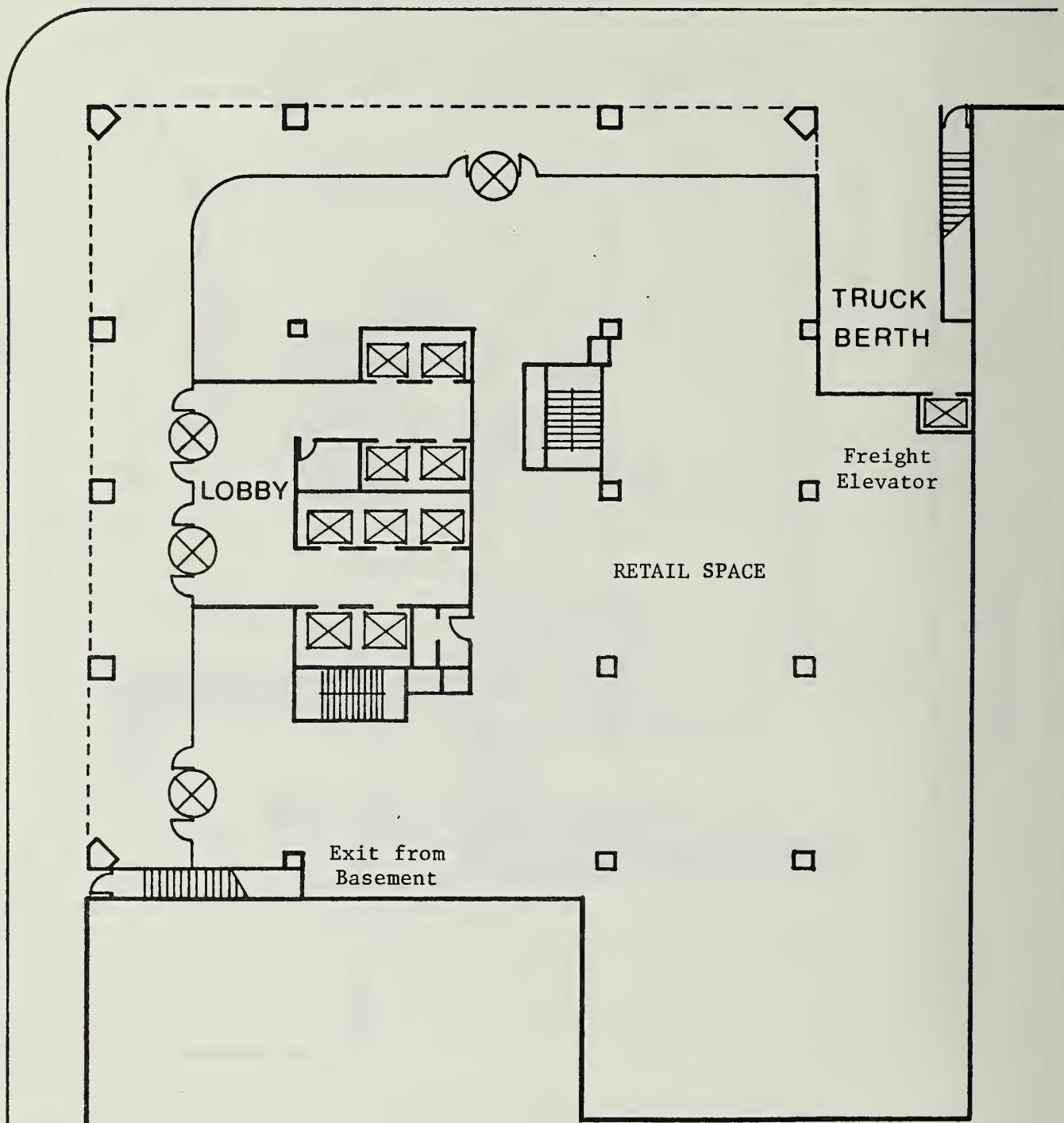


FIGURE 3A: REVISED GROUND FLOOR PLAN, 31-STORY BUILDING

Source: Corwin Booth & Associated Architects

BUSH STREET

MONTGOMERY STREET



N  
▲

FIGURE 3B: REVISED GROUND PLAN, 25-STORY BUILDING

Source: Corwin Booth & Associated Architects

approximately 3000 and 1100 net sq. ft. each. No tenants are presently identified for these retail spaces. It is possible that a retail banking unit may occupy the larger of the two spaces, although other sales-oriented activities are anticipated.

Entrance to the office tower would be via Montgomery Street. The Montgomery Street and Bush Street ground floor facades would be set back from the existing sidewalk line roughly 20 feet, to provide for pedestrian circulation. The ground floor facades on the other two sides would also be recessed approximately 10 feet, allowing circulation completely around the building. The building itself would be set back 25 feet from the east property line<sup>1</sup> and a plaza provided for use by building occupants and the public.

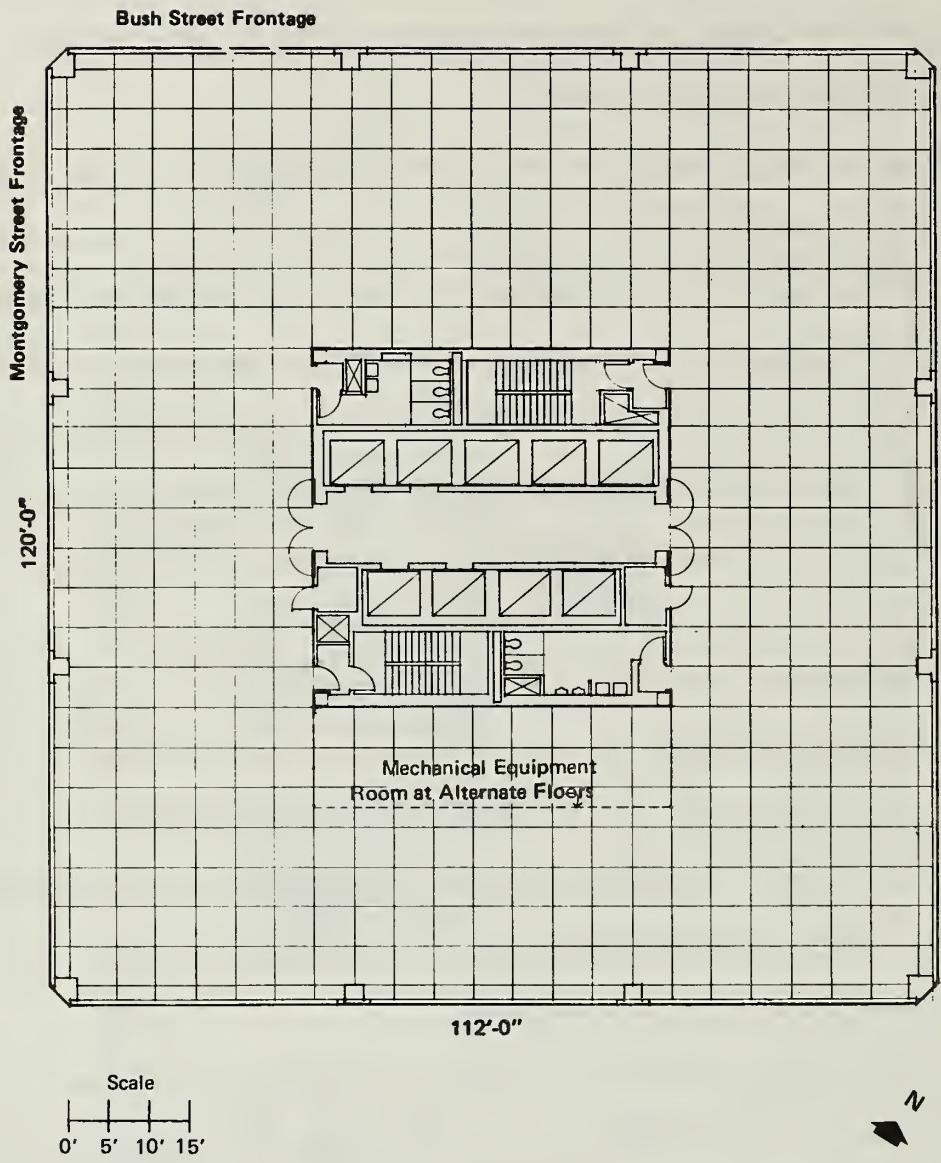
A single basement level of approximately 13,400 sq. ft. and a mechanical level of approximately 13,400 sq. ft. at the top of the tower are anticipated to be occupied by mechanical and building service equipment. A service dock area and parking for two service vehicles would be provided on the north side of the proposed building, accessing from Bush Street. No parking would be provided in the building.

The typical office tower floors shown in Figures 4 and 5 are nearly square rectangles of approximately 13,400 gross sq. ft., served by a central core of elevators and building support spaces. A typical lower floor net rentable area of approximately 12,400 sq. ft. is expected.

A small pedestrian bridge is proposed between the 19th floor of this building and the adjacent Standard Oil Building. The bridge would connect space to be leased by a present tenant of the Standard Oil Building and would be for the exclusive use of that tenant. A CONDITIONAL USE AUTHORIZATION WOULD BE REQUIRED.

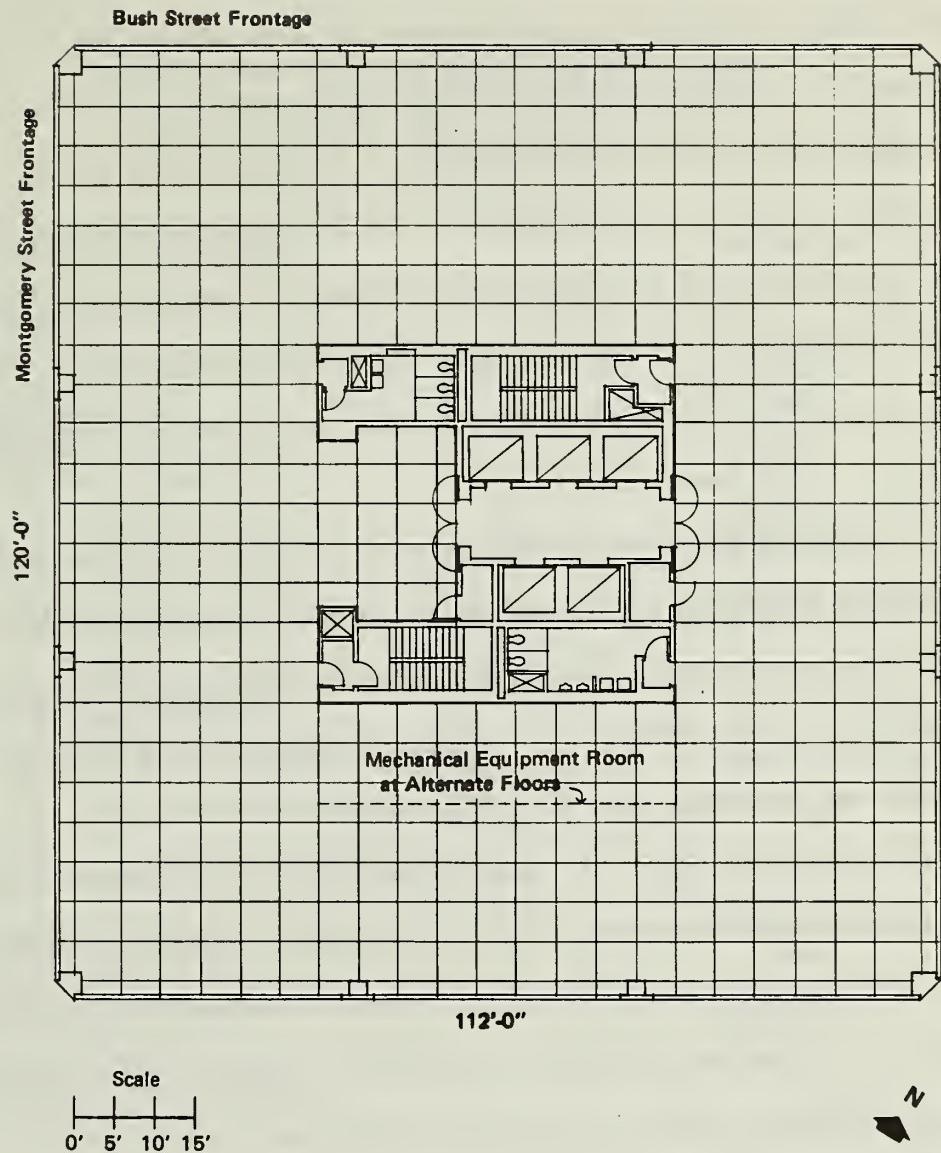
---

1. A deeded air rights easement extends horizontally 25 feet west from the east property line, upward from the roof of the existing Title Insurance Building.



Source: Skidmore, Owings & Merrill, Architects-Engineers.

FIGURE 4 TYPICAL LOW-RISE FLOOR PLAN



Source: Skidmore, Owings & Merrill, Architects-Engineers.

FIGURE 5 TYPICAL HIGH-RISE FLOOR PLAN

The developer anticipates that he will be allowed under the City Planning Code to build to a gross area of approximately 386,000 square feet, based on a Floor Area Ratio (FAR)<sup>1</sup> allowance of approximately 260,000 square feet and a bonus area<sup>2</sup> allowance of approximately 126,000 square feet. This assumes that a bonus allowance of 39,015 square feet will be approved for the proposed plaza as indicated in Figure 3, page 8. If the micro-climate conditions affecting the plaza cannot be mitigated to the City's satisfaction, the building would need to be redesigned to a lower gross area (less 39,015 square feet).

The actual gross area of the occupied 29-story building (but excluding the basement and top level of the building, both occupied exclusively by mechanical equipment and services spaces not counted in FAR analysis) would be approximately 382,000 sq. ft. Of this, approximately 349,000 sq. ft. are planned as net rentable area for office uses and 4120 sq. ft. as net rentable area for retail uses. If only 26 building floors were constructed, the building would have three fewer floors, approximately 40,300 gross sq. ft. less, and approximately 35,700 sq. ft. less of rentable office area, a reduction of approximately 11%. An analysis of the proposed building's area and dimensions based on a 29-story building, is presented in Table 1.

The building would conform in general to planning and zoning requirements relating to the site. The use zoning is "C-3-0" Downtown Office District

- 
1. Floor Area Ratio (FAR) is the maximum allowable ratio of the site area to the gross floor area of a building. For example, a FAR of 14:1, as for the proposed building, means that the maximum permitted gross floor area for the building is 14 times the area of the site.
  2. Section 122.3 of the City Planning Code provides for floor area bonus if buildings contain certain features such as plazas, setbacks, widened sidewalks, or rapid transit proximity. This floor area is in addition to that allowed by the FAR.

TABLE 1

## APPROXIMATE BUILDING AREAS AND DIMENSIONS

Planning Code Allowance and As Proposed  
 (29 Story Building Proposal)

<u>Floor Area Ratio (FAR) Allowance:</u> *	260,100 sq. ft. allowed
<u>Bonus Area Allowed For:</u> *	
Rapid Transit Proximity	10,500
Multiple Building Entry	13,005
Sidewalk Widening	39,015
Shortened Walking Distance	1,440
Plaza**	39,015
Side Setback	<u>23,025</u>
TOTAL BONUS AREA	126,000 sq. ft. allowed
<u>Total Building Area Allowance</u>	
Floor Area Ratio (FAR) + Total Bonus Area	386,100 sq. ft. allowed
<u>Derivation of Tower Height</u>	
Total FAR + Bonus Allowance	386,100 sq. ft.
Proposed Ground Floor Area =	5,900
Area Remaining for Tower	
386,100 - 5,900 =	380,200
Proposed Typical Tower Floor =	13,440
Number of Typical Tower Floors	
380,200 ÷ 13,440	28.29 tower floors
Therefore:	
Ground Floor + 28 Typical Tower Floors**	
Total Proposed FAR Building Area =	382,220*** sq. ft.
Allowed Area not used =	3,880 (1.00% of Total)

TABLE 1 (continued)

Site Coverage (building floor area ÷ site area)Proposed:  $13,440 \div 18,579 = 72\%$ 

Permitted: 100%

<u>Maximum Dimensions</u>	<u>Proposed</u>	<u>Permitted</u>
Height Above Grade	410 ft.	500 ft.
Building Length	120 ft.	170 ft.
Diagonal Dimension	165 ft.	200 ft.

Building Area Proposed

Total Occupied Building Area 382,220\*\*\*

Total Gross Area (including mechanical/  
service floors) 409,000\*\*\*

Net Rentable Area 353,302

Office 349,186  
Retail 4,116

\* The FAR and Bonus Area calculations are given in Appendix B.

\*\* Bonus allowance anticipated by developer based on proposed plaza. City approval is uncertain at this time.

\*\*\* Building includes one roof level floor and one basement of approximately 26,900 square feet total, housing mechanical/building service functions not included in FAR consideration. Penthouse enclosure on roof covers the protrusion through the roof of elevator shafts and equipment.

TABLE 1A

## APPROXIMATE BUILDING AREAS AND DIMENSIONS

Planning Code Allowance and As Proposed  
 (25 Story Building Proposal)

<u>Floor Area Ratio (FAR) Allowance:</u>	*	260,100 sq. ft. allowed
<u>Bonus Area Allowed For:</u>	*	
Rapid Transit Proximity		10,500
Multiple Building Entrances		13,005
Sidewalk Widening		19,817
Side Setback		<u>23,025</u>
TOTAL BONUS AREA		66,422 sq. ft. allowed
<u>Total Building Area Allowance</u>		
Floor Area Ration (FAR) + Total Bonus Area		326,528 sq. ft. allowed
<u>Derivation of Building Height</u>		
Ground Floor Area		15,048
2nd Floor Area		11,862.75
Upper Floor Area @ 12,993.75 x 23		<u>298,856.25</u>
Total Building Area @ 25 Stories		325,767 Square Feet
Total Allowance		326,528
Less Area Used		<u>- 325,767</u>
		761 Square Feet Unused

\*The FAR and Bonus Area calculations are given in Appendix B.

TABLE 1A (Continued)

Site Coverage (building floor area ÷ site area)Proposed:             $15,048 \div 18,579 = 81\%$ 

Permitted:            100%

<u>Maximum Dimensions</u>	<u>Proposed</u>	<u>Permitted</u>
Height Above Grade	338 feet	500 feet
Building Length	115.5 feet	170 feet
Diagonal Dimension	162 feet	200 feet

Building Area Proposed

Total Occupied Building Area	325,767	**
Total Gross Area (including mechanical/ service floors)	335,181	**
Net Rentable Area	274,559	
Office	262,776	
Retail	11,783	

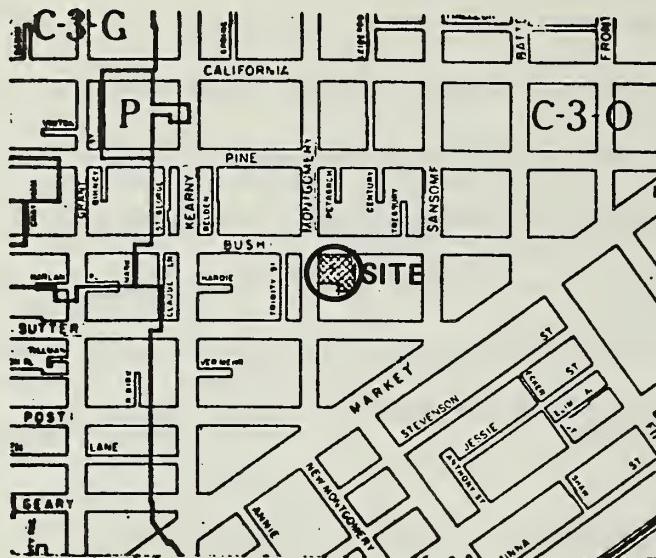
\*\* Building includes one roof level floor and one basement of approximately 9,414 square feet total, housing mechanical/building service functions not included in FAR consideration. Penthouse enclosure on roof covers the protrusion through the roof of elevator shafts and equipment.

within which proposed office and retail uses are permitted. It is in a "500-I" height and bulk zoning district which permits a maximum building height of 500 feet; above 150 feet in height a maximum length dimension of 120 feet and a maximum diagonal dimension of 200 feet is permitted. A conditional use permit would be required for the small bridge proposed between the 19th floors of the proposed building and the adjacent Standard Oil Building. Zoning for the site and surrounding area is shown in Figure 6.

The proposed architectural design of the building exterior is an expressed rectangular structural grid, with bronze solar glass and light colored surface materials. Clear glass will be used on the ground floor and retail areas. The form of the building is a rectangular office tower with a setback ground floor level. An elevation of the building is provided in Figure 7 and a section of the building in Figure 8.

The objective of the developer is to construct prime competitive office space in the finance and administrative district for the smaller, professionally oriented firms that comprise a large proportion of the finance and administrative district market for office space. This market is viewed by the developer as having a level of demand and revenue that presents an investment opportunity. Marketing of space is now being conducted with preliminary agreements being negotiated with prospective tenants.

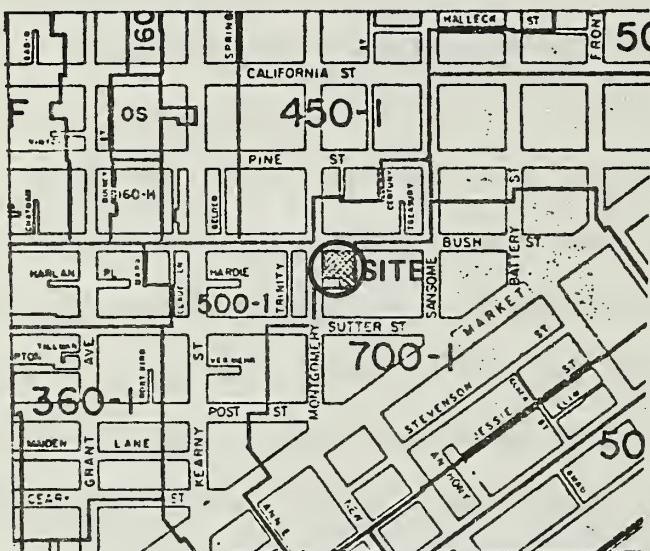
The floor-to-tenant ratio for the use of prime office space varies widely by the character of space and of tenant. The Alcoa Building and Crown-Zellerbach Building, with professional tenants similar to the market proposed for the proposed project, have overall building densities of about



**Key:**

- C-3-O      Downtown Office
- C-3-G      Downtown General Commercial
- P            Public

**Use Districts**



**Key:**

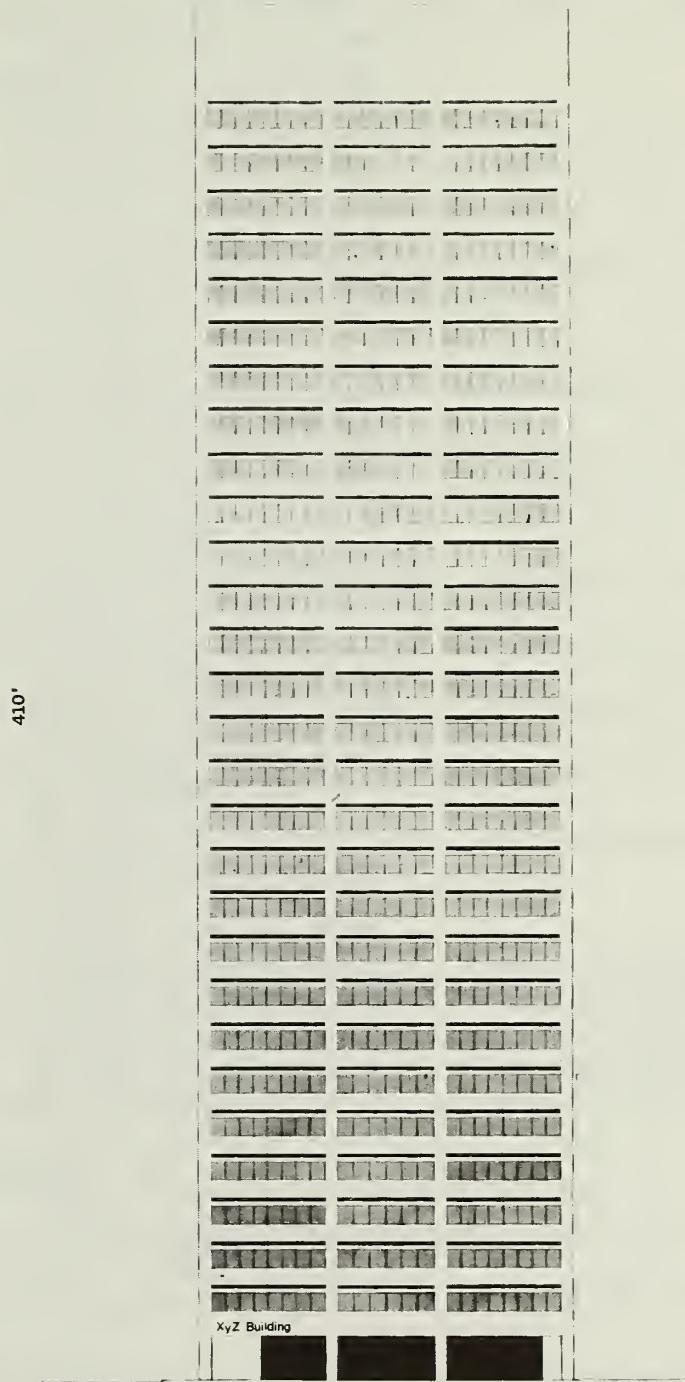
- 360-I      Maximum Height 360 Feet
- 450-I      Maximum Height 450 Feet
- 500-I      Maximum Height 500 Feet
- 700-I      Maximum Height 700 Feet

Buildings over 160 feet high in all above districts are limited to a maximum of 170 feet length and 200 feet diagonal dimension for portions of structures above 150 feet.

**Height and Bulk Districts**

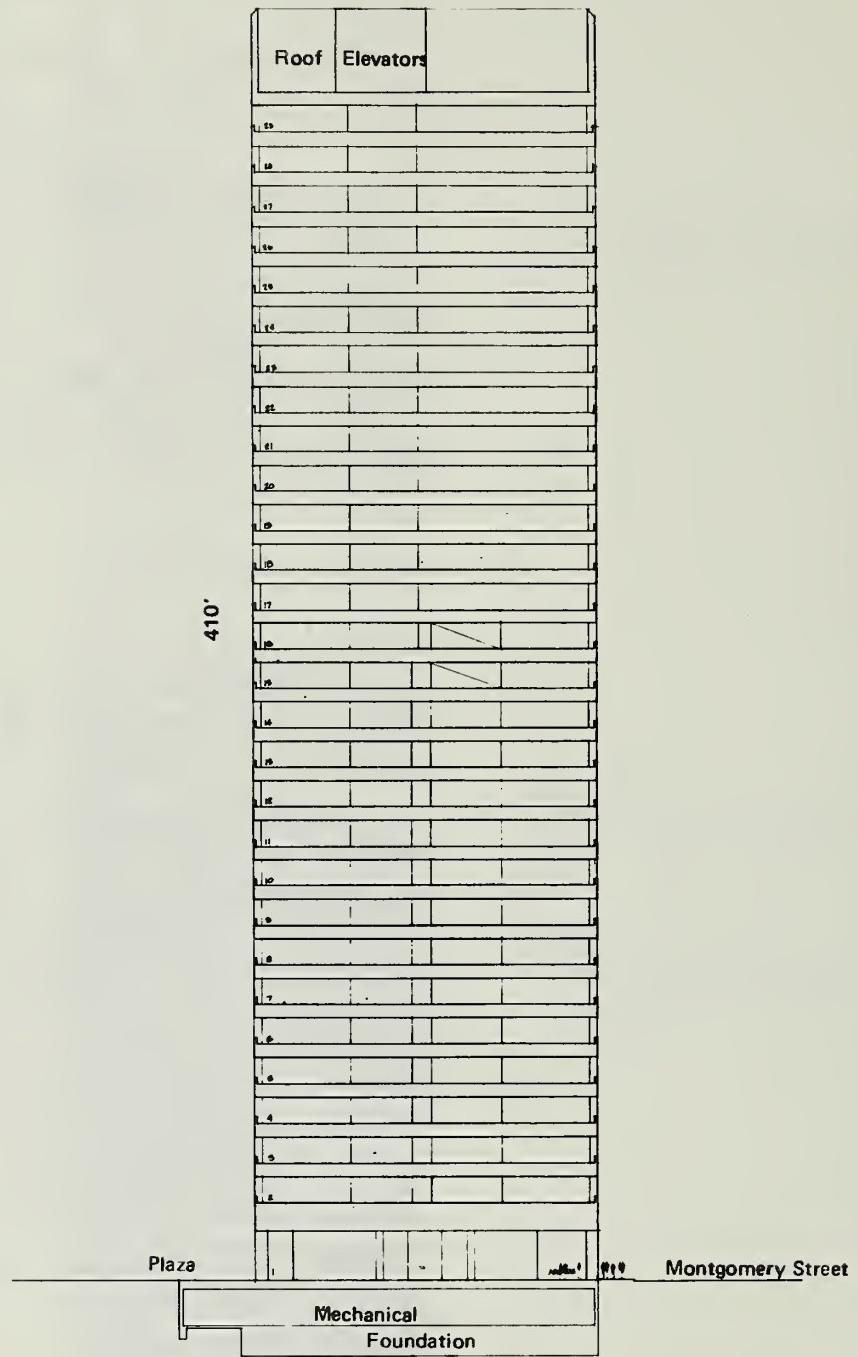


**FIGURE 6      ZONING FOR SITE**



Source: Skidmore, Owings & Merrill, Architects-Engineers.

FIGURE 7 ELEVATION, MONTGOMERY STREET



Source: Skidmore, Owings & Merrill, Architects-Engineers.

FIGURE 8 SECTION

175 sq. ft. per person. Specific individual offices in these buildings have densities of 250 net sq. ft. or more per person.

Based upon the tenants now tentatively anticipated and committed, the developer estimates that the total occupancy of the building would be approximately 1360 people.

In order to provide a worst case analysis of the impacts of the building, a factor of 150 net sq. ft. per person will be used in this report for calculations, resulting in an assumed building population of 2360.

The building project is in the schematic design state and only broad characteristics are defined. The size of the building is defined as between 25 and 31 floors. Refinements in design and building area may occur as the design is completed. Impacts have been described in this report in general on a conservative, worst case basis; a 29-story building has been assumed for most specific calculations. The final design of the proposed building is subject to possible detailed design review by the city staff and Planning Commission through the discretionary review power of the City Planning Commission.<sup>1</sup>

The firm of Skidmore, Owings & Merrill, Architects-Engineers, San Francisco, has been responsible for preliminary ~~design work to date~~. The firms of Corwin Booth And Associated Architects/would be responsible for completion of design.

The developer and architects presently anticipate that work on the site would begin with demolition of existing buildings in late 1977 and

---

1. Under the charter of the City and County of San Francisco, the City Planning Commission has the power to exercise its sound discretion over any permit application subject to review and approval by the City Planning Department.

TABLE 2  
TENTATIVE PROJECT SCHEDULE

Start Date	Late 1977
Dependent upon city permitting and project contracting processes	
Time Requirements	
Demolition	2 months
Excavation	3 months
Foundation	2 months
Framing	4 months
Mechanical, infill, and finish	<u>9 months</u>
TOTAL	20 months
Completion Date	Late 1979

Source: Skidmore, Owings & Merrill, Architects-Engineers.

be completed by the end of 1979, lasting roughly 20 months. A tentative schedule is presented in Table 2. This schedule is dependent upon permitting procedures and project contracting processes.

Construction of the proposed building is estimated by the architects to cost approximately \$17,500,000 in 1976 dollars.<sup>1</sup>

---

1. Estimated at the Engineering New Record Index of Building Construction Cost index number 1487, as defined in the December 1976 issue of Engineering News Record.



### III. ENVIRONMENTAL SETTING

The site is presently occupied by three older buildings which would be demolished. Those buildings and others near the site are shown in Figures 9, 10, 11, and 12. (See also Figures 1 and 2.)

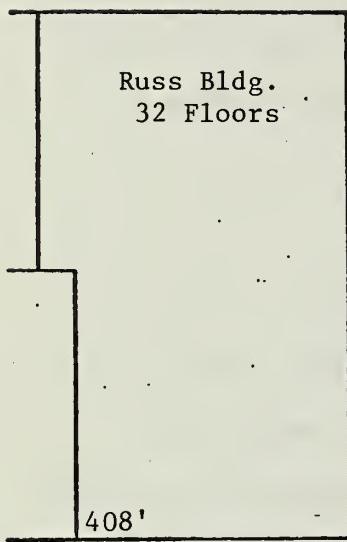
#### A. EXISTING BUILDINGS

The site contains three structures on Assessor's Block 289: the E. F. Hutton Building on lot 6B (160 Montgomery Street), the Title Insurance Building on lot 6A (275 Bush Street/148 Montgomery Street), and the Gibraltar Savings Building on lot 6C (140 Montgomery Street).

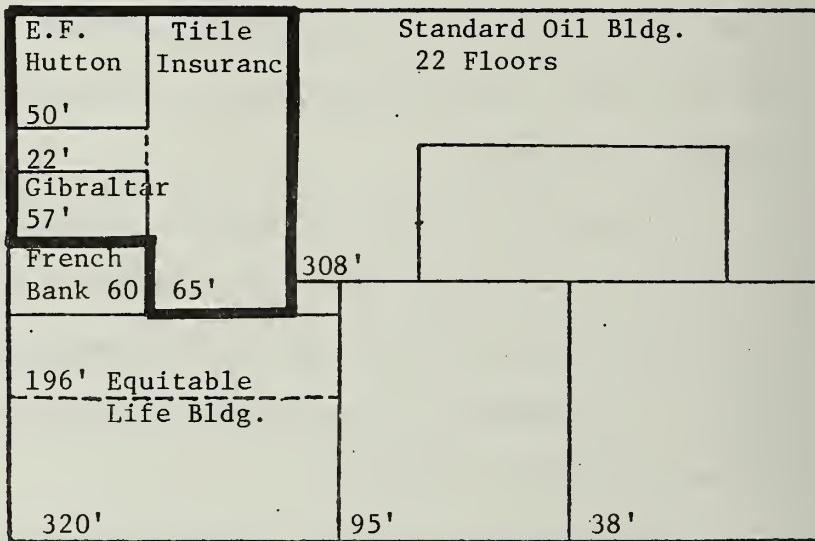
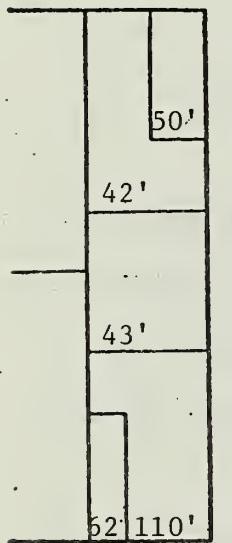
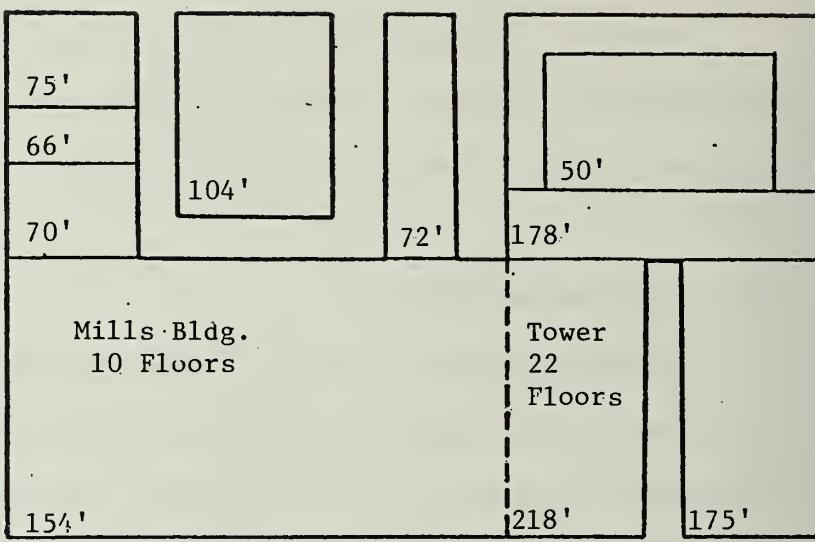
Since their purchase by the present owner in 1974, these buildings have been available for occupancy on a 60-day lease basis. The tenants at the time of the sales have moved to other permanent locations in the financial district.

The ground floor of the Gibraltar Building is presently occupied by a stationery/art supply store that expects to vacate shortly. Approximately 1600 square feet of the Title Insurance Building are occupied by a dress shop. The remainder of the existing facilities, including all of the E.F. Hutton Building, is vacant.

The buildings do not meet current seismic structural requirements of the city building code nor the requirements of the city parapet ordinance.



**MONTGOMERY**



**SUTTER**

N  
→

FIGURE 9 PROJECT SETTING, WITH BUILDING HEIGHTS

**SANSOME**

FIGURE 10 EXISTING E.F. HUTTON BUILDING





FIGURE 11 BUSH STREET VIEW OF EXISTING BUILDINGS





FIGURE 12 MONTGOMERY STREET VIEW OF EXISTING BUILDINGS





<u>Building</u>	<u>Date of Construction</u>	<u>Net Rentable Square Feet</u>	<u>Number of Floors</u>
140 Montgomery Street	1922	11,400	Basement, 4 Floors
160 Montgomery Street	1922	19,396	Basement, 3 Floors
275 Bush Street	1921	31,330	Basement, 4 Floors, + Mezzanine

#### B. SCENIC AND HISTORICAL ASPECTS

The proposed site is a corner of the principal street of the financial district, seen daily by people in the financial district. Individual buildings near the site and their height are shown in Figure 9.

The E.F. Hutton Building on the project site is a four-story, light-colored concrete building in the neoclassic style,<sup>1</sup> one of the few remaining in the financial district. It occupies the corner lot. The Foundation for San Francisco's Architectural Heritage has reviewed the buildings existing on the site and nearby (see Appendix C). It states:

"The E.F. Hutton Building is a very good example of low-rise classical buildings of the type that once dominated Montgomery Street. An important building with high visibility."

The Title Insurance Building on the project site is a five-story T-shaped building with a red brick neo-Georgian<sup>2</sup> facade on Bush Street. The Gibraltar Savings Building on the site is of three stories with a remodeled facade, dominated by a three-story high concrete grillwork screen.

- 
1. Neoclassic is an architectural style based upon the classic styles of ancient Greece and Rome.
  2. Neo-Georgian is an architectural style based on the style developed in England during the Georgian Era, especially the period 1714-1760.

The French Bank Building at 130 Montgomery, adjacent to the site, is a narrow, six-story building with a tall, narrow masonry facade in the art deco style.<sup>1</sup> The Foundation for San Francisco's Architectural Heritage states:

"The building has fine ornamentation and a very nicely carried out design that works well with the buildings narrow shape. The entrance is dramatically treated and flanked by bas reliefs of muscular figures. The copper (bronze?) spandrels are very beautifully designed with zig zag motifs. Its color harmonizes with its neighbor to the south. There are very few buildings in this style in San Francisco, and this is one of the finest. An important architectural embellishment to downtown. Whatever is built next to it should try to respect it."<sup>2</sup>

Concerning the buildings grouped at the street intersection, the Foundation notes:

"The most important architectural feature of this important intersection is the buff color of the brick and terra cotta clad Mills, Russ and Alexander Buildings. The Mills and Russ Buildings are premier landmarks in the Financial District. It is especially important that the venerable Mills Building not be overwhelmed by an unsympathetic neighbor."<sup>3</sup>

The west side of Montgomery Street opposite the proposed building is dominated by low buildings with a variety of retail shops and services. The number and character of small retail-oriented enterprises that remain in the area and along Montgomery Street are important factors in keeping the area a pleasant, even colorful pedestrian area. The City Planning Department has recognized this and desires to maintain or expand such activities.

- 
1. Bevis Hillier, Art Deco of the 1920s, 1968. "Art deco is an assertively modern style developing in the 1920s and reaching a high point in the 1930s; it drew inspiration from ... art nouveau, cubism, the Russian Ballet, American Indian art, and the Bauhaus ... it ran to symmetry ... and to the rectilinear."
  2. Randolph Delehanty, The Foundation for San Francisco's Architectural Heritage, June 28, 1976.
  3. Ibid.

Development guidelines prepared for the site by the City Planning Department state that "Ground level uses that generate pedestrian interest should be developed along Bush and Montgomery Streets. Retail shops and eating and drinking places would be desirable. Street level building frontage devoted to the building's lobby should be minimized."<sup>1</sup>

The block of Bush Street east of Montgomery is dominated by the long, solid masonry facade of the 22-story Standard Oil Building on the side of the street containing the proposed project site, and by the long 10 and 22 story terra cotta facade of the Mills Building on the opposite side of the street.

A bronze plaque mounted on the corner of the E.F. Hutton Building identifies the block containing the proposed site as the location of the first California State Fair, a California Historical Registered Landmark.

#### C. TOPOGRAPHY, GEOMORPHOLOGY, DRAINAGE, SEISMICITY

Prior to the filling of the San Francisco Bay in the early 1850s, the site and its surroundings were covered with wind deposited sand dunes. The upper portion of the dune sand was subsequently removed and used as fill material within the Bay to achieve the present shoreline.<sup>2</sup>

The site is now covered by the three existing buildings. All three buildings have single-level basements, some of which are extended in part underneath the existing sidewalks. Surface runoff drains into the San Francisco combined storm and sanitary sewer system.

- 
1. San Francisco Department of City Planning, Guidelines for Development: Southeast Corner of Montgomery and Bush Streets, September 22, 1975, Revised October 30, 1975.
  2. P.D. Trask, and J.W. Rolston, "Engineering Geology of San Francisco Bay, California," Geol. Soc. America Bulletin, V. No. 9, p. 1085, 1951.

Elevation is approximately 20 feet (San Francisco datum).<sup>1</sup> While test borings have not been taken at the site, the following subsurface conditions have been found for areas near the site:<sup>2</sup>

Pine and Sansome

15' to 20' Fill (Below Surface)  
10' + Bay Mud  
Below 35' Sand and Clay  
Water Table 12' +

Montgomery-Sutter-Market

2' Fill  
30' Thick Sand  
10' Thick Clay  
40' Thick Sand  
110' Bedrock Sandstone  
Water Table 30'

Sansome and Market

20' Fill  
10' Bay Mud  
Sand and Clay Below Bay Mud

- 
1. San Francisco datum is the point, line, or surface with reference to which elevation is measured by the Department of Public Works, City and County of San Francisco.
  2. Letter from George E. Hervert, Vice President, Woodward-Clyde Associates, consulting engineers, geologists, and environmental scientists to Michael Hall, Gerald D. Hines Interests, December 2, 1975.

In common with the rest of San Francisco, the site is in an active seismic belt, classed by the State of California Department of Natural Resources as being in the zone of most severe potential earthquake damage.<sup>1</sup> The San Andreas and Hayward fault systems pass within about seven and twelve miles of the site, respectively.

The site is located in "an area of liquefaction potential".<sup>2</sup> According to Blume, "all areas where man-made fill rests upon soft bay mud or consolidated sand may be considered to possess a liquefaction hazard potential."<sup>3</sup> Blume also notes that the site is in an area of potential subsidence hazard.<sup>4</sup>

- 
1. The California Division of Mines and Geology has divided the state into three zones based upon the maximum expected intensity of an earthquake occurring in the zones. San Francisco is located in the highest severity zone. The probable maximum intensity for an earthquake in this zone is IX or X as measured by the modified Mercalli Scale of 1931. The effects of an earthquake of intensity of IX or X are expected to be general panic by people, substantial ground disruption, and substantial damage to buildings and to the city's physical infrastructure. From: State of California, Division of Mines and Geology, Urban Geology Master Plan for California, Bulletin 198, Sacramento, California, 1973, pp. 20-21.
  2. Liquefaction: Earthquake induced transformation of a stable granular material, such as soil, into a fluid-like state similar to quicksand.
  3. John Blume and Associates, San Francisco Seismic Investigation, prepared for the San Francisco Department of City Planning, June 1974.
  4. Subsidence: An uneven local settlement of the ground's surface. Although it can occur under static (normal) conditions, it is frequently activated by strong ground motion, such as that from a major earthquake.

The three buildings presently on the proposed site, including the E.F. Hutton Building, have been identified by the Department of Public Works<sup>1</sup> as having cornices and other facade elements that could fall during an earthquake, which consequently must be removed or secured in a structurally improved manner.

#### D. OTHER PROJECTS IN AREA

This project is one element of the long term growth in office related activities presently occurring in the finance and administrative district and broader downtown area. This is further discussed in the following section. Employment in the downtown area north of Market Street is projected to increase by 35,000-51,000 jobs in the years 1973-2000, representing from 45% to 32% of total new employment in the city (for respective low and high projections). Demand for new office space in the downtown area north of Market Street is projected to total about 4.7 million sq. ft. over the next 12-year period.<sup>2</sup>

A significant portion of this space has been developed since 1973. The San Francisco Department of City Planning reports that it knows of only two other large office building projects now committed within the projected area (defined by the city as a two-block radius of the site).

First California Bank Building (previously titled Bank of Tokyo)  
Case EE 74.170, February 27, 1975  
Located at California and Sansome  
Under construction

- 
1. Lew, Franklin, Structural Engineer, Chief Parapet Safety Section, Department of Public Works, City and County of San Francisco. Three letters dated 2 Feb. 1976, to City Savings and Loan Association (concerning lot 6C), Northern Counties Title Insurance Company (concerning lot 6B), and Northern Counties Title Insurance Company (concerning lot 6A).
  2. San Francisco Department of City Planning, Commercial Trends: Report Containing Background Information for the Commerce and Industry Element of the Comprehensive Plan of San Francisco, July 1975.

23 stories  
348,127 gross sq. ft.  
294,441 net rentable sq. ft.  
Approximately 1100 persons occupant

595 Market Street

Case EE 74.322

1975

Approved but not yet under construction, project uncertain at this time.

29 stores

427,693 gross sq. ft.

378,000 net rentable sq. ft.

Approximately 2665 persons occupant

Separate EIRs are available from the City Planning Department for each project.

Under construction outside the project area, but within the finance and administrative district is the Bechtel Building at 333 Market Street. Other large office buildings either now being completed or proposed for sites adjacent to the finance and administrative district include One Market Plaza (foot of Market), Embarcadero III (Davis and Clay), and 505 Sansome.

E. LAND USE AND OFFICE SPACE DEMAND

The proposed Montgomery-Bush site is in the center of the finance and administrative district. This district is the location of most major San Francisco firms in finance, insurance, real estate, business services, and administrative units. These are establishments whose activities require close contact with clients located in the district and/or enjoy considerable benefits from the agglomeration of similar activities of the district. Consequently, the land use in this district is characterized by high-density office use.

An average annual growth of approximately 800,000-1,000,000 gross sq. ft. has occurred in recent years for competitive office space, the great majority of this new space is constructed in the finance and administrative district.<sup>1</sup> The buildings constructed since 1960 average 26 stories and approximately 534,000 gross sq. ft. per building. Being larger and more spacious than older office stock, they reflect a new emphasis on increased personal space for efficiency and prestige, and more functional space for records storage and such supportive services as business machines and computer systems.<sup>2</sup>

The Department of City Planning, in a background report to the San Francisco Comprehensive Plan, stated that "... Barring any long-term economic downturn, future demand for new office space will be strong in San Francisco."<sup>3</sup> Recent vacancy surveys of downtown office buildings support this finding.

A June 1976 article in the San Francisco Examiner<sup>4</sup> reported that the vacancy rate for office buildings constructed between 1964 and 1971 was less than 1%. Of the 15 buildings completed from 1972 to 1975, the rate was reported to be at 9%. The bulk of this vacant space was located in the partially completed One Market Plaza building located at the end of Market Street. For purposes of comparison it was reported that the vacancy rates in Los Angeles and New York are running at about 20%.

---

1. San Francisco Department of City Planning, Commercial Trends, op. cit.

2. Ibid.

3. Ibid.

4. Donald Canter, "Skyscraper Boom is Slowing Down," San Francisco Examiner, Business Page, June 9, 1976.

The strong demand for office space in the finance and administrative district<sup>1</sup> is due in part to national employment growth trends shifting steadily toward administrative activities, coupled with the fact that San Francisco is one of the few American cities in demand both as a national and regional center.<sup>2</sup> A recent survey<sup>3</sup> conducted for the applicant by Grubb and Ellis found a negligible vacancy rate of about 1% along the Montgomery Street corridor, the corridor in which the applicant proposes to construct the building.

Grubb and Ellis reports that there was in 1975 an anticipated demand of 5,000,000 net sq. ft. or a 23% increase over existing space through 1978.<sup>4</sup>

At present there are two other office space projects<sup>5</sup> committed in the district. Together these projects will supply 625,000 net sq. ft. of new office space. This combined with the estimated available 400,000 net sq. ft.<sup>6</sup> fails to satisfy the estimated demand by approximately 3,750,000 net sq. ft. The inclusion of office space in buildings proposed for areas adjacent to

- 
1. San Francisco Department of City Planning, Commercial Trends, op. cit.
  2. Ibid.
  3. Bill McCubbin (Grubb & Ellis Commercial Brokerage Company), Recent Trends in High Rise Office Space Construction and Absorption, San Francisco Financial District (undated copy).
  4. Ibid.
  5. California First Bank - Sansome and California streets - 274,000 net sq ft; 595 Market Street - 378,000 net sq ft.
  6. Bill McCubbin, op. cit.

the district<sup>1</sup> increases the projected supply to a maximum of 2.708 million net sq. ft., an amount still failing to meet the existing demand by approximately 2.29 million net sq. ft.

#### F. TRANSPORTATION AND CIRCULATION

##### 1. Transit Service

The finance and administrative district, containing the proposed site, is the centroid of much of the transit service of the city and has the greatest variety and level of transit service in the city. Access to transit services near the proposed site is shown in Figure 13. Each category of transit is described below.

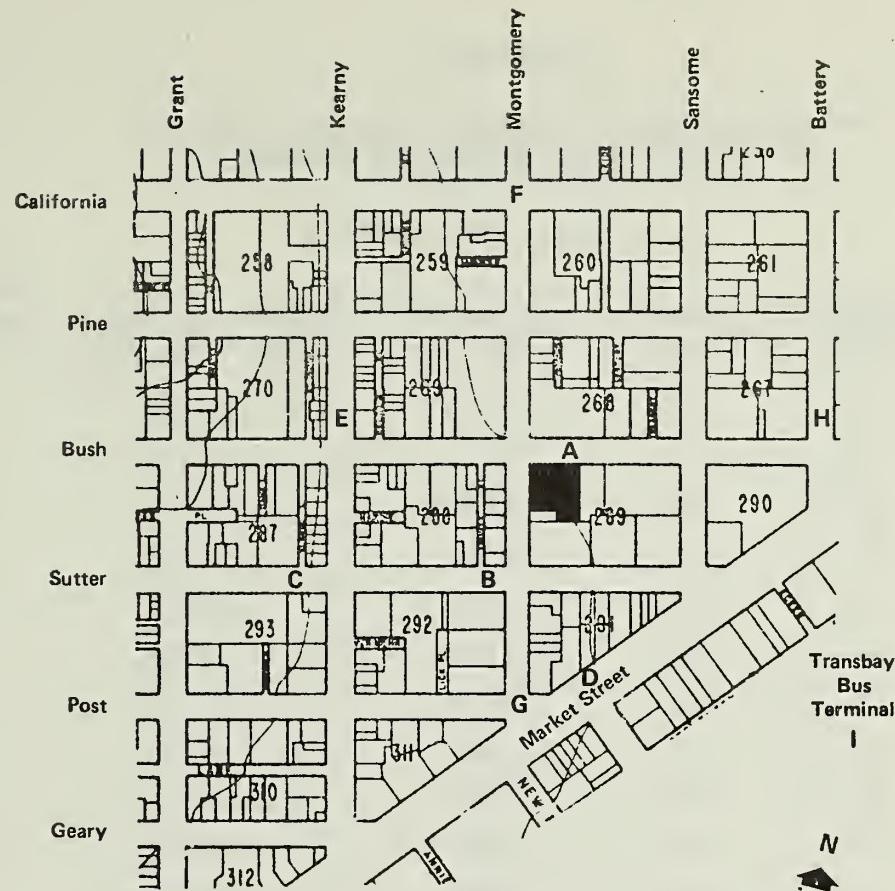
- San Francisco Municipal Railway (Muni). Within two blocks of the site are 20 Muni lines, providing access throughout the city. These are shown on Figure 13. Ridership is shown on Tables 3A and 3B. Muni is presently operating routes and vehicles to the full capacity of its budget. The Muni does not anticipate any increase in its budget which would allow it to increase the capacities of its motor coach, trolley, and cable car lines. Therefore, any increase in the capacity of one of these lines would result through a proportional decrease in the capacity of another line.

---

1. Name of Building	Location	Amount Available
One Market Plaza	Foot of Market	700,000 net sq.ft. as of 6/76
Bonel No. 2	Howard and Main	220,000 net sq.ft.*
Embarcadero III	Davis and Clay	600,000 net sq.ft.*
505 Sansome Street	505 Sansome Street	<u>163,000</u> net sq.ft.* 1,683,000

\*Assumes 100% vacancy.

Source: Grubb & Ellis Commercial Brokerage Company.



**Key:**

- A Bus Stop for Inbound Muni Lines 1, 2, 3, 4, 42, 45, and Southbound Line 15
- B Bus Stop for Outbound Muni Lines 1, 2, 3, 45
- C Bus Stop for Northbound Muni Line 30 (southbound runs on Stockton)
- D Bus Stop for Inbound and Outbound Muni Lines 5, 6, 7, 8, 21, 31, J, K, L, M, N
- E Bus Stop for Northbound Muni Line 15
- F Stop for California Street Cable Car
- G Montgomery Street BART Station Entrance
- H Bus Stop for Outbound Golden Gate Transit Buses to Marin and Sonoma Counties (nearest inbound stop is at Sacramento and Sansome)
- I AC Transit and Greyhound Service to the East Bay

FIGURE 13 TRANSIT SERVICES IN VICINITY OF PROPOSED BUILDING

TABLE 3A  
PATRONAGE/CAPACITY PROFILES FOR MUNI LINES  
SERVING THE SITE OF PROPOSED PROJECT

A.M. PEAK HOUR 7:30-8:30

<u>Line</u>	<u>Schedule Vehicles</u>	<u>Average Seats</u>	<u>Schedule Seats</u>	<u>Schedule Capacity*</u>	<u>Observed/Observed Load**/Capacity</u>	<u>% Utilization of Observed Capacity</u>
1-3	19	50	950	1425	805/1275	63
2,2x	34	48	1632	2448	1740/1728	100
5	15	50	750	1125	793/750	101
6	14	48	672	1008	605/936	65
7	8	48	384	576	285/504	57
8	18	48	864	1296	809/936	86
15	34	48	1536	2448	1126/1440	78
21	12	50	600	900	501/750	67
30	16	50	800	1200	1135/1200	95
30x	16	46	736	1104	714/966	74
31	15	48	720	1080	1253/1080	120
45	12	48	576	864	794/864	92
61	10	32	320	720	500/720	69
85	OPERATES DURING OFF-PEAK HOURS ONLY					
J	17	54.4	925	1665	827/1272	65
K	12	54.4	653	1175	707/588	120
L	19	54.4	1034	1861	699/882	79
M	8	54.4	435	783	536/686	78
N	21	54.4	1142	2056	1280/1469	87

\*Capacity - Capacity is defined by the Muni as 150% of the number of seats for coaches and trolleys, 180% for street cars and 225% of the number of seats for cable cars.

Capacity is not a measure of the maximum number of individuals who could ride on a vehicle at one time, but is the level of service which Muni has defined as acceptable.

\*\*Load - Load is the number of persons riding on a line during a specified period.

Source: San Francisco Public Utilities Commission, James Finn, Director of Transportation.

TABLE 3B  
PATRONAGE/CAPACITY PROFILES FOR MUNI LINES  
SERVING THE SITE OF PROPOSED PROJECT

P.M PEAK HOUR 4:30-5:30						
<u>Line</u>	<u>Schedule Vehicles</u>	<u>Average Seats</u>	<u>Schedule Seats</u>	<u>Schedule Capacity*</u>	<u>Observed/Observed Load**/Capacity</u>	<u>% Utilization of Observed Capacity</u>
1-3	20	50	1000	1500	1220/1500	81
2, 2x	26	48	1248	1872	1232/1224	100
5	18	50	900	1350	824/825	100
6	14	48	672	1008	785/1008	78
7	8	48	384	576	328/526	57
8	17	48	816	1224	928/1152	81
15	33	48	1584	2376	1141/1296	88
21	13	50	650	975	580/825	70
30	19	50	950	1425	1072/1200	89
30x	10	46	460	690	576/621	93
31	16	48	768	1152	892/792	110
45	11	48	528	792	679/792	86
61	11	32	352	792	650/720	90
OPERATES DURING OFF-PEAK HOURS ONLY						
J	12	54.4	653	1175	710/1076	65
K	13	54.4	707	1273	519/587	88
L	16	54.4	871	1568	717/783	92
M	10	54.4	544	979	815/882	92
N	18	54.4	980	1764	1166/1273	92

\*Capacity - Capacity is defined by the Muni as 150% of the number of seats for coaches and trolleys, 180% for street cars and 225% of the number of seats for cable cars. Capacity is not a measure of the maximum number of individuals who could ride on a vehicle at one time, but is the level of service which Muni has defined as acceptable.

\*\*Load - Load is the number of persons riding on a line during a specified period.

Source: San Francisco Public Utilities Commission, James Finn, Director of Transportation.

- Bay Area Rapid Transit (BART). The proposed project is located two blocks from the Montgomery Street BART station (see Figure 13). Hours of service are currently from 6:00 a.m. to approximately 1:00 a.m. on weekdays; no weekend service is normally provided. BART states that demand currently exceeds capacity on trains serving this station during the evening peak from 4:30 p.m. to 6:00 p.m. Capacity will not be increased until the California State Public Utilities Commission gives approval. This approval will be based on the solution of a number of problems, which cannot be adequately assessed here. Over the next five years BART expects to increase its daily capacity to 200,000 person-trips per day. It projects that in five years daily demand will be between 170,000 and 180,000 person-trips per day; it presently operates at a level of 130,000 person-trips per day.<sup>1</sup>
- Golden Gate Transit. The Golden Gate Transit District provides commuter bus service between Marin County and the finance and administrative district during peak hours, operating on Battery Street inbound (arriving 6:46-9:50 a.m.) and Sansome Street outbound (departing 3:30-6:15 p.m.). The inbound bus stop is two blocks from the project site; the outbound bus stop is four blocks from the site (see Figure 13). The District states that capacity is presently sufficient for demand.<sup>2</sup> Service other than during commute hours is available on the Civic Center route, with the closest stop at the Transbay Terminal, three "long" blocks from the proposed project site.
- Alameda-Contra Costa Transit District. Bus service to and from Alameda and Contra Costa counties is provided by the AC Transit District at the Transbay Terminal, three "long" blocks from the proposed project site (see

---

1. Conversation with Bill Hein, Director of Planning, BART, December 22, 1976.
2. Conversation with Jerome M. Kuykendall, Assistant to General Manager for Planning and Research, Golden Gate Bridge, Highway and Transportation District.

Figure 13. The District states that capacity is presently in balance with demand, and that additional service could be provided with existing equipment.<sup>1</sup>

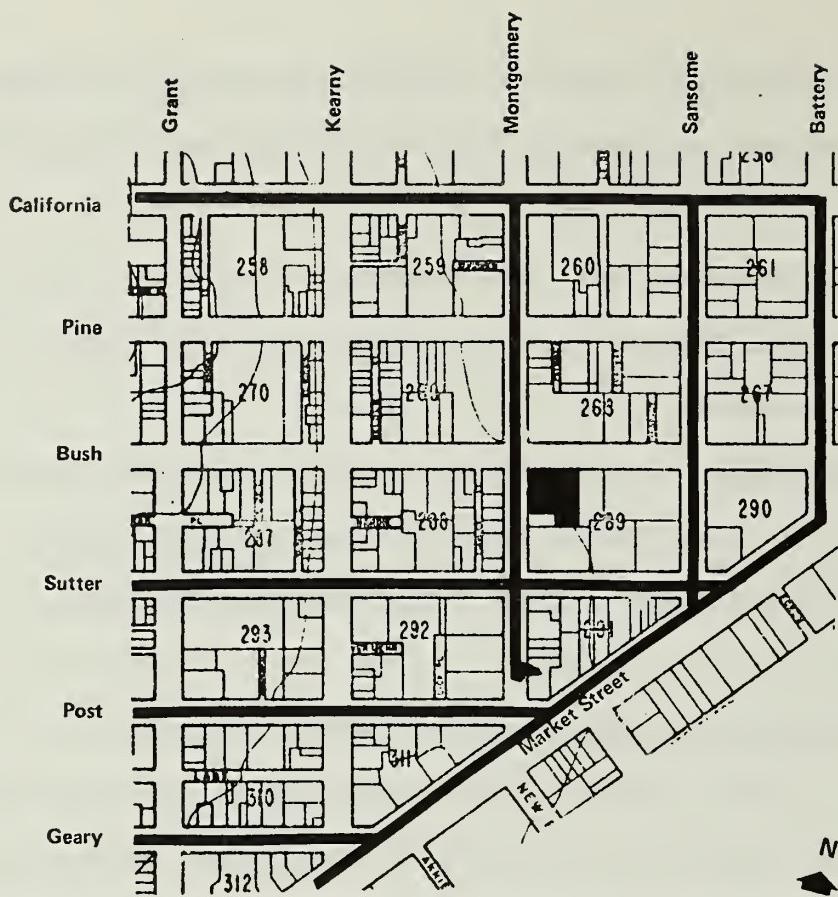
- Greyhound. Greyhound provides commuter service to and from the Peninsula and northern Contra Costa County at the Transbay Terminal and the 7th and Market streets terminal.
- Southern Pacific. Train commuter service to and from the Peninsula is provided at the Southern Pacific Depot, 4th and Townsend streets, approximately 11 blocks from the proposed project. Connecting transit service is provided by Muni.
- Transit Preferential Streets. Those streets in the area of the project designated as "transit preferential streets" by the Transportation Element of the San Francisco Master Plan are shown on Figure 14. Priority is given to mass transit on these streets by measures such as exclusive lanes, timing of traffic lights, restriction of auto turning movements, etc.

## 2. Vehicle Access

- Major and Secondary Thoroughfares. Figure 15 shows those streets designated by the San Francisco Master Plan's Transportation Element<sup>2</sup> as major thoroughfares, defined as cross-town thoroughfares whose primary function is to link districts within the city and to distribute traffic from and to the freeways. There are no designated secondary thoroughfares, defined as intra district serving as collectors for major thoroughfares, within the project area.

---

1. Conversation with Don Larsen, Senior Planner, AC Transit.
2. Adopted by Resolution 6834 of the San Francisco City Planning Commission on April 27, 1972.



Source: San Francisco Master Plan, Transportation Element.

FIGURE 14 DESIGNATED TRANSIT PREFERENTIAL STREETS



Source: San Francisco Master Plan, Transportation Element.

FIGURE 15 DESIGNATED MAJOR THOROUGHFARES

Street System. Characteristics of the street network adjacent to the project are shown in Figures 16 and 2 (on page 49 and 7 respectively). Counts of existing traffic at the Bush-Montgomery intersection were taken by Arthur D. Little, Inc., (ADL) as Department of Public Works counts were not available, and have been given in Table 4. Freeway access to and from the San Mateo Peninsula and the East Bay is nearby (see Figure 2, page 7).

### 3. Parking

There are approximately 4140 off-street parking spaces in commercially operated garages and lots within roughly two blocks of the proposed project. Conversations by the firm of Arthur D. Little, Inc., with operators of these facilities indicate that daily occupancy is typically about 80%. Within a two block radius of the site there are 168 meters, all limited to 30 minutes. One hundred and seven of these meters are in Special Truck Loading Zones, usually limiting availability to service vehicles before 1:00 p.m. on weekdays.

The location of commercial garages and lots providing off-street parking is given in Figure 17. The location of on-street parking, including the locations of truck loading zones, special truck loading zones, and passenger loading zones is provided in Table 14 of Appendix D, page 131, and tow-away restrictions are defined in Figure 21 of Appendix D, page 134.

### 4. Bicycle Access

Market, Sansome, and Battery have been designated as bicycle routes in the Transportation Element of the San Francisco Master Plan. Although these streets are designated as streets which should be improved as bicycle routes (see Figure 22 in Appendix D, page 135), there is no immediate plan to do so.

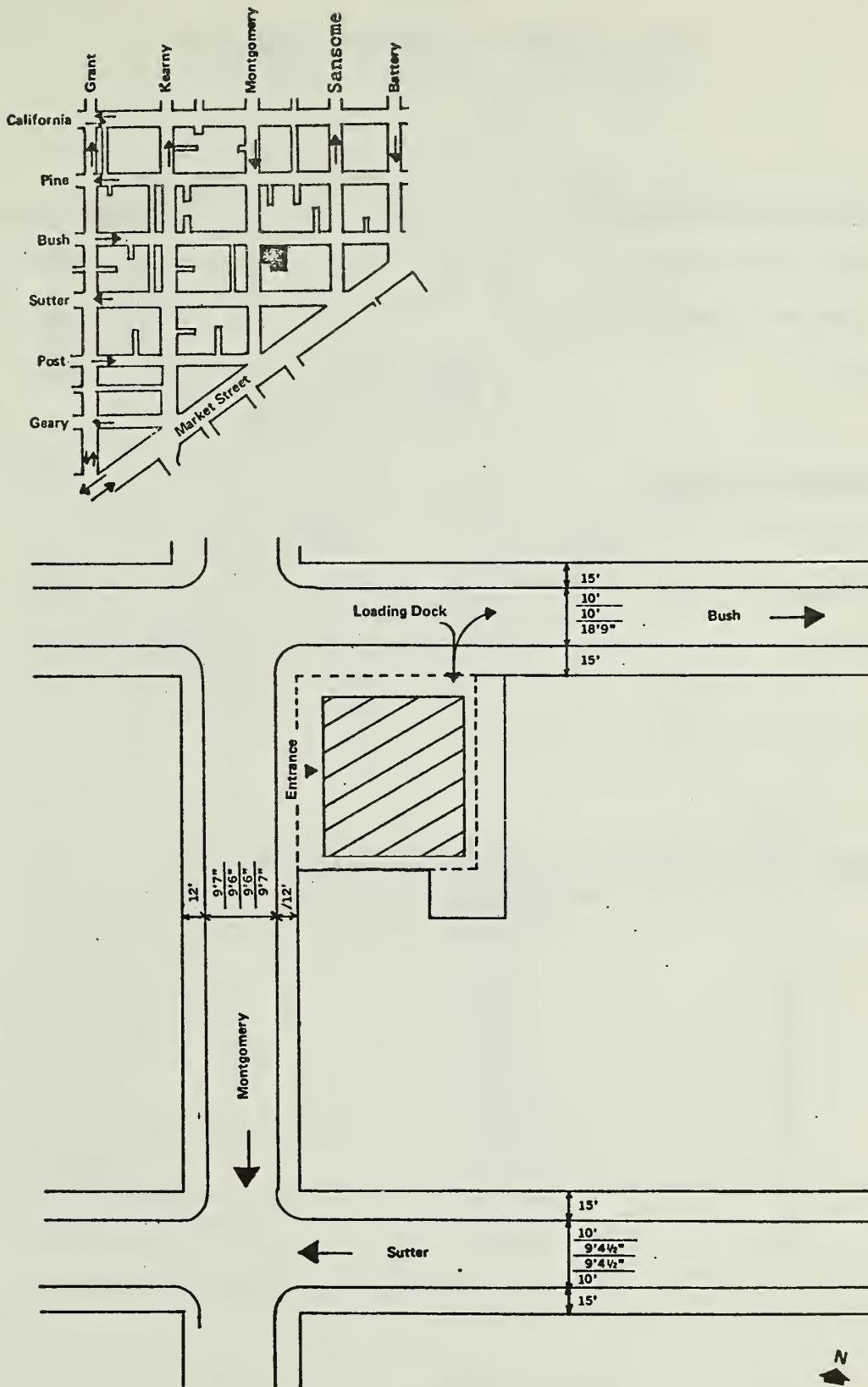


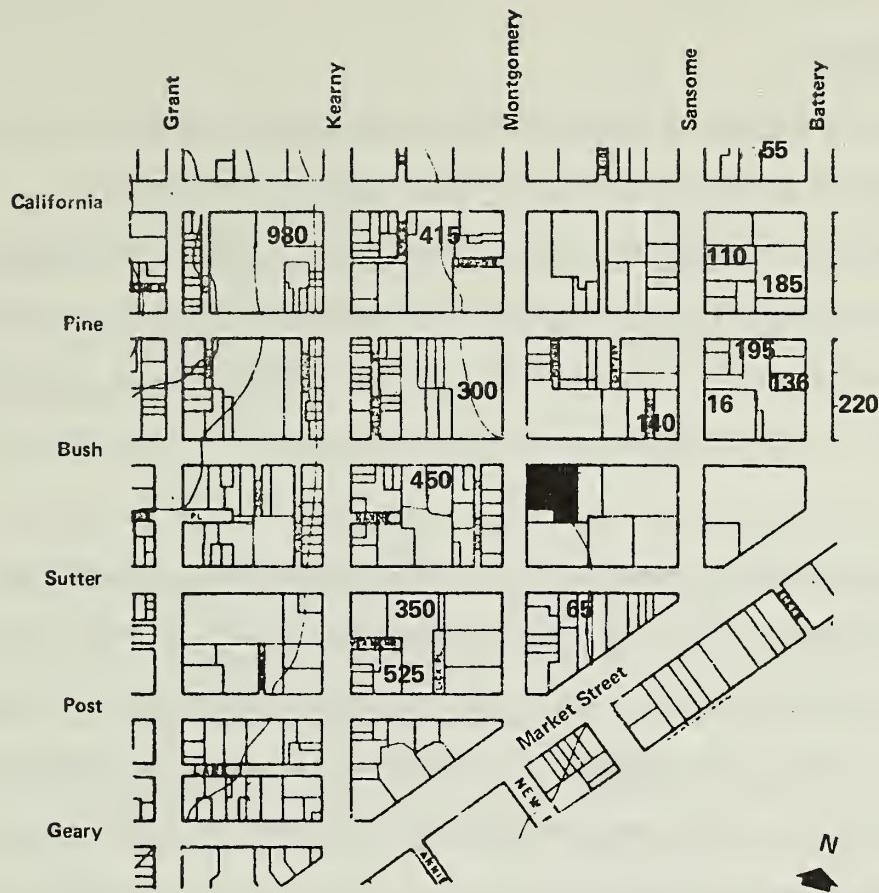
FIGURE 16 EXISTING STREET NETWORK

TABLE 4

TRAFFIC COUNTS FOR MONTGOMERY STREET AND  
BUSH STREET 4:30 P.M. to 5:30 P.M.

<u>Southbound on Montgomery</u>	<u>Number of Vehicles</u>
Left Turn to Bush	185
Straight on Montgomery	<u>799</u>
Total	984
 <u>Eastbound on Bush</u>	
Right Turn to Montgomery	347
Straight on Bush	<u>862</u>
Total	1,209

Source: Count conducted by Arthur D. Little, Inc., on  
Wednesday, June 30, 1976.



Garage	Address	Off-street Parking Spaces
320 California Garage	320 California	55
Plaza Parkade Garage (Bank of America headquarters)	555 California	415
Exchange Center Garage	238 Pine	195
Private Garage	515 Pine	N.A.
Mills Building Garage	220 Bush	140
Financial Center Garage	345 Bush	450
Sutter Hotel Garage	191 Sutter	65
White House Parkade	223 Sutter	350
Lick Garage	55 Lick Place	525
St. Mary's Square Garage	433 Kearny	980
Russ Building Garage	235 Montgomery	300
222 Sansome Street Garage	222 Sansome	110
Private Garage	160 Sansome	16
R. Stanley Dollar Building Garage	135 Battery	185
Commercial Center Garage	36 Battery	220
Shell Building Garage	35 Battery	136

Approximate Number of Off-street Parking Spaces

4,142

FIGURE 17 OFF-STREET PARKING

## G. AIR QUALITY

Carbon monoxide is the most commonly emitted air pollutant in urban areas, comprising roughly three-quarters of automobile emissions. Localized concentrations are of concern for this pollutant. Three factors are important in estimating the concentrations reached in particular areas: the characteristics of vehicular sources, the emissions rate of individual vehicles, and the meteorologic process that results in dispersion of emissions.

The San Francisco Department of Public Works has only limited data available concerning vehicular trip loadings on streets within the finance and administrative district. The focus of their efforts is on "cordon counts," the count of the number of vehicles entering or leaving particular areas of the city as they pass through the perimeter of that area. Counts are occasionally made within the district, however, and data were available to permit an analysis of carbon monoxide concentrations at intersections of Bush and Montgomery (the proposed project site), and at the Pine and Sansome intersection and California and Sansome intersection (both heavily traveled and near the proposed project).

Vehicular emissions rates are a complex function of the internal combustion technology of various model years combined with deterioration and modified by differences in the operating characteristics of the engine under varying speeds, loads, and temperature. The U.S. Environmental Protection Agency (EPA) approach has varied in recent years, and currently stresses the empirical nature of auto emissions based on the actual driving cycle observed. Data in the most recent supplement to the publication

AP-42<sup>1</sup> focuses on empirical measurement and emphasizes the errors of projection, presenting empirical data for calendar years 1972 and earlier. In some instances, the carbon monoxide empirical emissions level data for low route speeds is 4 times greater than earlier projected emissions for the same year. Analysis for this study was therefore made on the basis of both EPA 1972 rates and Bay Area Air Pollution Control District (BAAPCD) projected rates.<sup>2</sup>

The meteorology of pollutant dispersion in cities is complex and little understood by comparison with analysis suitable for vehicular sources in relatively open country. The most obvious urban component -- large buildings and canyon-like streets -- complicate the airflow patterns, wind speed, and mixing characteristics. Both "typical" and "worst" case meteorologic conditions were hypothesized for this analysis.

These factors are further elaborated upon in Appendix E , where the process is described by which estimates were made of carbon monoxide concentrations at the identified three intersections.

- 
1. U.S. Environmental Protection Agency, Office of Air and Waste Management/Office of Air Quality Planning and Standards, Supplement No. 5 for Compilation of Air Pollutant Emission Factors, Second Edition, Supplement to AP-42, December 1975.
  2. Bay Area Air Pollution Control District, Guidelines for Air Quality Impact Analysis of Projects, June 1975.

Those calculations indicate that if emmissions levels for individual vehicles follow the empirical data recently presented by the EPA, several street segments now produce levels of carbon monoxide concentration in excess of state and federal one-hour standards when winds are parallel to the street segment during worst case air stability conditions. Conversely, consideration of emissions projections based on 1980 technological improvements and defined by BAAPCD result in lower carbon monoxide levels and no violation of the ambient air quality standards for this pollutant.

The complexity of the urban situation combined with the necessarily elaborate algebraic combination of rather variable parameters leads to a substantial degree of variation in the estimates of carbon monoxide experience. Actual carbon monoxide levels under most circumstances are expected to be lower due to the greater role of turbulence induced by surface roughness than has been taken into account in the model used. There are, however, meteorologic conditions which closely mimic the worst case such that it does represent a realistic albeit conservative estimate of pollutant conditions that may be experienced on the order of several days per year.

The large numbers of pedestrians on the streets of the finance and administrative district during peak traffic hours are the principal receptors exposed to these concentrations.

Where local air quality is most affected by carbon monoxide concentration, regional air quality is most affected by hydrocarbons and nitrogen oxides, essential ingredients in the formation of oxidants and photochemical smog. As oxidants are normally formed hours and miles away from the source of emissions, impacts must be assessed on a regional basis rather than localized to San Francisco. The Bay Area's primary source for

these oxidants is motor vehicles. The federal one-hour photochemical oxidants standard of 160 micrograms per cubic meter ( $160 \text{ ug}/\text{m}^3$  or 0.08 ppm) not to be exceeded more than once per year, has superceded the older California one-hour standard of 200 micrograms per cubic meter ( $200 \text{ ug}/\text{m}^3$  or 0.10 ppm). The federal standard was in fact reported exceeded on 60 days in 1974 at San Francisco Air Basin monitoring stations. In San Francisco specifically, the federal standard was reported exceeded twice in 1973 with a maximum concentration of 0.12 ppm, four times in 1974 with a maximum of 0.14 ppm, and was not exceeded in 1975.<sup>1</sup>

#### H. CLIMATE

Temperatures in San Francisco are moderate owing to the influence of marine air. Temperatures are highest in fall and lowest in winter; both spring and summer are normally cool, with a frequency of low clouds and fog. Wind in San Francisco is strongest in late spring and throughout the summer months, and lightest in winter.

The construction of many high-rise office buildings in the finance and administrative district has resulted in increased wind force and shadow at street level in that area, and wind tunnel tests are now required of any proposed building to provide information to city staff of the building's affect on its microclimate.

#### I. BIOTA

There are street trees on the sidewalk adjacent to the Montgomery Street side of the site. Typical urban birds, rodents, and insects represent the non-human biota on or near the site, in addition to typical urban micro-organisms.

---

1. This data corresponds to that issued by the BAAPCO and the Air Resources Board, in that it is not adjusted for measurement error identified in 1975. Actual maximum concentrations are estimated at 80% of given figure.



#### IV. ENVIRONMENTAL IMPACT

If the building were to be occupied with tenants having a density of less than one person per 150 net square feet, the population-related impacts (transportation, water, sewage, etc.) would tend to be proportionately reduced (e.g., related impacts of 1360 occupants as estimated by the developer would tend to be 58% of those of the 2360 occupants used in the calculations below).

##### A. SEISMIC HAZARD

The site is in an active seismic area with a potential for liquefaction subsidence. Unless soils investigations and building design were conducted in accordance with the procedures and requirements determined by the City Building Codes and the Community Safety Element of the Comprehensive Plan of San Francisco, risk of potentially dangerous damage to the building and harm to its occupants would be increased. The developer and his design consultants will conform or surpass these city requirements.

However, even if the building is designed to minimize the consequences of an earthquake, the building may be affected by an earthquake in such a manner that there would be falling objects, glass, etc., within the building and particularly from the building which could seriously harm persons and property near it.

##### B. HISTORICAL, CULTURAL, ARCHAEOLOGICAL, ARCHITECTURAL AND SCENIC ASPECTS

The E. F. Hutton Building is a low-rise neoclassic structure of an earlier cultural and architectural design period that contributes to the visual appearance and familiarity of the finance and administrative district. It, and

the two adjoining neo-Georgian and contemporary style buildings would be demolished by the proposed project and replaced by a single contemporary design high-rise building.

The finance and administrative district is today increasingly dominated by high-rise office towers of a design idiom that is both "new" and of much larger urban scale. The result to the people of the area is a loss of "familiar" buildings, the loss of buildings that reflect ingrained cultural images, the loss of buildings that have much small scale architectural detail work. The frequent public criticism is that the new buildings are not "warm" or "human." This is of course to some extent a matter of design and can be mitigated in new buildings. In addition, the growth of office towers tends to decrease the amount of retail activity at street level, particularly of small shops, that adds much to the color and interest that is found enjoyable in San Francisco streets.

The proposed project would provide approximately 3860 net sq. ft. of new retail space at street level, where 2000 net sq. ft. had existed before, with at least part of this in shop functions that did not exist here at all before.<sup>1</sup> It would also widen the sidewalk area, and provide a small public plaza beside the building. The success of this and the extent to which the building as a whole is responsive to psychological aspects of human reaction will depend largely on design decisions yet to be made. The project design at the time of this writing has been defined in only broad terms.

---

1. Retail banking may occupy the larger room (approx. 3000 net sq. ft.) of the proposed building ground floor, leaving the remainder for retail shops. The ground floor (2000 net sq. ft.) of the Gibraltar Building housed the Gibraltar Savings and Loan retail banking activity prior to sale and relocation.

Visually, the new building would replace a small cluster of low buildings on a corner dominated by surrounding high buildings (see Figures 9, 11, and 12 on pages 24, 27, and 29). The new building would therefore conform to its neighbors and the street, but reduce the variety of heights. It would be approximately 90 ft. lower in height (or 126 ft., if only 25 office floors are built) than that permitted by San Francisco zoning, and thus does not optimally reinforce the visual aspect of a "hill" of office buildings envisioned by the Urban Design Plan. However, the existing buildings in the blocks surrounding the proposed site are also substantially below the height limit. The proposed building at 29 stories and 410 ft. height would be taller than any other building at the corner of Montgomery and Bush streets, 102 ft. higher than the Standard Oil Building adjacent on Bush street, 90 ft. higher than the Equitable Life Building on Montgomery, and approximately the same height as the Russ Building on the northwest corner of the intersection. Height of existing buildings in the area of the proposed project are shown in Figure 9 on page 24, and photographs of the adjacent buildings are shown in Figures 11 and 12 on pages 27 and 29.

The developer and architect of the proposed project state that the proposed building's facade would be light in color, in conformance with city guidelines. Approximately 50% of the facade would be bronze glass, and the remainder would be opaque wall. The project is subject to discretionary review if deemed desirable by the City Planning Commission.

A plaza area, open to the public, would be provided by the developer on the east side of the site. Approximately one-third of the plaza area is in an arcade under the office tower. Access would be from both Bush Street (approximately 35-ft. frontage) and Montgomery Street (by an 80-ft. long

walkway, approximately 6 ft. wide); the plaza could extend approximately 195 ft. to the rear of the site. Its use would be constrained by both configuration and exposure to wind and shadow (see Microclimate); the plaza would not receive sun at any time. No open plaza space now exists in the area of the proposed project. This space is shown in Figure 3 on page 8. Detailed design of the proposed plaza has not been undertaken at this time.

During the summer of 1976 the proposed demolition of the three buildings was called to the attention of the Landmarks Preservation Advisory Board. At that time, one board member noted that a State Historical Landmark plaque is attached to the E.F. Hutton Building identifying the site as the location of the first California State Fair. It was requested that it should be preserved and mounted in a prominent location on the proposed building.<sup>1</sup>

No historical or archaeological findings are anticipated beneath the site, because of extensive historical cut and fill operations during development of this area of the city, removing pre-existing sand dunes, and establishing the existing sub-soil condition. The site does lie in the "yellow zone" of the San Francisco Archaeological Sensitivity Map, defined by the Department of City Planning as a zone having less than a "high" potential for significant archaeological finds, but still having a high possibility of containing material of archaeological interest.

#### C. LAND USE

The proposed project would reinforce the financial and administrative activity patterns of land use in the project area and would provide 288,000

---

1. Ed Michael, Secretary of the Landmarks Preservation Advisory Board, conversation of December 22, 1976.

additional net square feet to meet an anticipated demand of 5,000,000 net sq. ft. for the finance and administrative district through 1978. The building represents one increment in the pattern of new office construction discussed under Land Use in the preceding chapter.

Tenants for the proposed building would come from new businesses moving to San Francisco because of its position as a national and regional center, upwardly mobile existing San Francisco establishments seeking more prestigious space, and existing San Francisco establishments which are seeking increased proximity to clients or other institutions in the finance and administrative district but who may previously have been unable to obtain sufficient space due to the district's low vacancy rate.

The existing San Francisco establishments, by their move to new space, would tend to release older, less expensive space to other tenants. If this older space is located in or adjacent to the finance and administrative district, it would probably be readily rentable. Grubb and Ellis in a report<sup>1</sup> to the applicant noted that the demand for office space in the finance and administrative district is so strong that it causes the renovation and renting of existing older space. In a June, 1976 San Francisco Examiner article,<sup>2</sup> Elmer Johnson, Vice President of the Building Owners and Managers Association was reported as noting that most older buildings "were feeling no pain" with regard to vacancies. Older space in less central locations would not be as readily rentable as that near the finance and administrative district.

The only retail function on the site when purchased for this project was the 2000 sq ft Gibraltar Savings and Loan branch office serving

---

1. Bill McCubbin, op. cit.  
2. Donald Canter, op. cit.

customers (a stationery store now occupies the space on a temporary basis). The proposed project would provide approximately 4120 net sq. ft. of retail space in two separate units on the street level. The larger unit, of 3000 sq. ft., may be occupied by a retail banking activity, but at minimum the 1120 sq. ft. unit, and possibly both spaces, would add new materials-sales retail activities on a site where previously there was none, and expand total retail area by 2120 net sq. ft. City Planning Department guidelines for development of the site emphasize ground level uses that generate pedestrian interest. This project would do that, but the department would strongly prefer to have shop or eating/drinking activities rather than a retail bank activity.<sup>1</sup>

#### D. ECONOMIC

##### 1. Permanent Employment

Total employment in the new building would be between the developer's estimate of 1360 persons and a conservatively high estimate of 2360 persons, depending upon the ratio of professional to support personnel of the actual tenants (see discussion p. 16). If the building were to be occupied by only professional firms, such as lawyers and accountants, its population would be lower than if it were occupied by both professional firms and general business firms. The developer expects the building to be occupied principally by professional firms doing business in the finance and administrative district.

---

1. Conversation with David Lynch, San Francisco Department of City Planning, December 2, 1976.

The buildings currently on the site, if fully occupied, could house a population of approximately 410 persons. On December 31, 1976, most of the existing floor space was vacant, with only the Title Insurance Building being partially occupied by a dress shop and the Gibraltar Building partially occupied by a stationery/art supply store. The two stores reported their total employment at that date to be 10 employees.

Approval of the proposed building would result in a net increase of between 1350 and 2350 over the existing number of employees on the site and a 950-1950 increase over the number of employees on the site if the existing buildings were fully occupied.

The San Francisco Planning and Urban Renewal Association High-Rise Study<sup>1</sup> surveyed the demographic characteristics of a sample of downtown office buildings (1022 office workers surveyed in 1974) and reported an occupational and income distribution as seen in Table 5.

The developer's expectations and present tentative lease commitments suggest that employment in the proposed project will lead to a larger percentage of professional and higher income persons than the SPUR survey distribution.

The jobs represented in the proposed project are closely related to the ongoing expansion of downtown office-oriented employment discussed in preceding sections. Although many of the specific jobs located in the proposed building would not be new jobs with new employees (it is anticipated that most of the firms would relocate from other office buildings in the area), the net effect for the area and city would be an increase of jobs and employees.

---

1. San Francisco Planning and Urban Renewal Association, Detailed Findings, Impact of Intensive, High-Rise Development in San Francisco, Final Report, June 1975.

If the demand for office space is sufficiently high that little or no change would result in office space utilization elsewhere, as indicated in the preceding Land Use Impacts section, the proposed project would result in a net increase of 950-1950 jobs to the area (equivalent to the net increase of jobs the proposed building would house on-site in comparison to the existing buildings).

TABLE 5  
DEMOGRAPHIC CHARACTERISTICS OF DOWNTOWN OFFICE  
BUILDING WORKERS

Occupational Distribution

Clerical	44%
Professional and Technical	30
Managers and Proprietors	19
Sales	5
Other/Not Reported	2
Total	100%

Individual Income Distribution (i.e., salaries and wages)

Under \$8,000	18%
\$ 8,000 - \$ 9,999	16
10,000 - 14,999	22
15,000 - 19,999	19
20,000 - 24,999	10
25,000 - 49,999	10
50,000 or Over	2
Not Reported	3
Total	100%

2. Construction Employment

Estimates provided by the architects, based on past experience with similar buildings, the proposed building would require 216 person-years of on-site labor. That is, construction of the building would provide the equivalent of 216 full-time construction jobs of one year duration. The

architects expect the total of wages and salaries for these jobs over the construction period would be about \$6.7 million.

Based upon a survey by the Human Rights Commission of construction workers on city projects that found a maximum of 40%<sup>1</sup> of workers on construction occurring in San Francisco live in San Francisco, it is estimated that a maximum of \$2.7 million would accrue directly to these city residents.

Other studies have indicated that San Francisco resident employees spend 80%<sup>2,3</sup> of their disposable income in the city. Their purchases become income to those who sell goods and services, and they in turn spend a portion of their income on purchases and so on. The resulting increase in the level of economic activity supports additional jobs for San Francisco residents. An additional \$2.6 million would be added to the San Francisco economy by the expenditures of these resident construction workers.

Other studies indicate that non-resident workers spend approximately 10%<sup>4,5</sup> of their disposable income in the city. Their expenditures would add approximately \$10.4 million to the city's economy.

In summary, the San Francisco economy would receive up to approximately \$2.7 million or 86 person-years of construction employment, and approximately 77<sup>6</sup> person-years of non-construction employment as a result of this project.

- 
1. Conversation with Stanley Lim, Contract Representative, San Francisco Human Rights Commission, December 14, 1976.
  2. Arthur D. Little, Inc., Table 4, Footnote C, p. V-18, op. cit.
  3. San Francisco Department of City Planning, Final Environmental Impact Report, Bank of Tokyo of California Building, EE74.170, February 1975.
  4. Arthur D. Little, Inc., Table 4, Footnote C, p. V-18, op. cit.
  5. Final Environmental Impact Report, Bank of Tokyo of California Building, op. cit.
  6. Based on a multiplier of 0.9 other jobs for each construction job, as presented in Final Environmental Impact Report, Bank of Tokyo California Building, ibid.

It should be noted that this would tend to support existing jobs rather than stimulate new jobs. Non-resident construction workers would spend the majority of their salaries and wages in communities outside San Francisco. Therefore, the impact of their employment and expenditures would be felt strongest in those communities.

#### E. POPULATION

Based on the assumptions discussed above in the Permanent Employment section and unpublished data from the SPUR High-Rise Study, Table 6 shows the expected geographical and individual income distribution for the estimated 2360 persons who would be employed in the building.

TABLE 6

#### RESIDENTIAL AND INDIVIDUAL INCOME DISTRIBUTION OF EMPLOYEES OF PROPOSED BUILDING

<u>County</u>	Salary or Wage <u>Less than \$15,000</u>		Salary or Wage <u>Greater than \$15,000</u>		<u>Total</u>	
San Francisco	708	30%	260	11%	968	41%
San Mateo-	189	8	212	9	401	17
Santa Clara						
East Bay	283	12	307	13	590	25
North Bay	165	7	236	10	401	17
Total	1,345	57%	1,015	43%	2,360	100%

Sources: Unpublished data - SPUR High-Rise Study, San Francisco Office Worker Survey, Keyser Marston Associates, 1975.

#### F. PUBLIC REVENUES

The existing land uses on Assessor's Block 289, lot 6A, 6B, and 6C have a total declared assessed valuation of land and improvements of

\$930,000 as of March 1, 1976. This figure is broken down by land and improvements below:

TABLE 7

EXISTING ASSESSED VALUATION OF LAND AND IMPROVEMENTS ON SITE

Block 289	<u>Land</u>	<u>Improvements</u>	<u>Total</u>
Lot 6A - 275 Bush & 148 Montgomery	\$350,000	\$ 50,000	\$400,000
Lot 6B - 160 Montgomery	227,150	97,850	325,000
Lot 6C - 140 Montgomery	97,850	107,150	205,000
Total	\$675,000	\$255,000	\$930,000

Source: San Francisco Assessor's Office.

At the present San Francisco tax rate (July 1, 1977 - June 30, 1978) of \$12.82 per \$100 of assessed value, these parcels generate approximately \$119,000 in property taxes based upon a total land and improvement assessed value of \$926,000.

Using an estimated cost of construction of \$17,500,000, the assessed value of the parcels at the time of completion of the proposed building would be approximately \$5,050,000 excluding the value of office furniture, machines, etc., and assuming no increase in the value of the land. This is a net increase of \$4,120,000 in assessed value and, at the 1977 tax rate, of \$528,000 in property taxes.

G. TRANSPORTATION AND CIRCULATION

It is estimated the proposed building would generate approximately 2360 home-to-work round trips each weekday, based on an assumed maximum building population of 2360. The professional activities located within the building would generate additional trips by occupants and by visitors. As locational proximity is a primary reason for choosing office space within the finance and administrative district, it is assumed that most additional trips will be

local, and that the total of extended trips will be equivalent to the theoretical occupancy of the building (not all occupants would be present on any one day).

If the existing buildings on the site were fully occupied with office related uses, they would generate approximately 410 home-to-work round trips each work day. The net impact of the project would then be the generation of 1920 round trips each weekday. However, as the existing buildings are now largely unoccupied and current transportation system figures do not include their use, the gross proposed impact of 2360 round trips per day is used in the analyses below. The net impact, however, is 19% less when adjusted for theoretical occupancy of the structures now existing on the site.

If the developer's estimates of 1360 occupants is accurate, home-to-work round trips would be proportionally reduced to 58% of that based on 2360 occupants as calculated below. However, there would tend to be an increased proportion of professional personnel in the building, which would tend to increase the proportion of suburban residents and private automobile use.

#### 1. Place of Residence and Modal Split

Using data from the San Francisco Planning Department and from the San Francisco Planning and Urban Renewal Association (SPUR) Survey of CBD office workers<sup>1</sup> it is possible to anticipate the mode of transportation San Francisco office workers use to get to their jobs, i.e., their "modal split." For the estimated 2360 employees which would be added to the Bush and Montgomery location, place of residence and modal split are presented in Table 8

---

1. The data used is unpublished, provided by Keyser Marston Associates. The findings of this study are contained in SPUR High-Rise Study, op. cit.

It has been assumed that the place of residence distribution of the employees of the proposed building would be the same as for present downtown office workers.

TABLE 8

PLACE OF RESIDENCE AND MODAL SPLIT OF EMPLOYEES ADDED BY PROPOSED PROJECT

Location	Number of Employees		Mode of Travel							
	Number	%	Auto Number	Auto %	Transit Number	Transit %	Walk Number	Walk %	Other Number	Other %
San Francisco	968	41	282	29	552	57	116	12	19	2
San Mateo/ Santa Clara Co.	401	17	525	81	76	19	-	-	-	-
East Bay	590	25	342	58	248	42	-	-	-	-
Marin/Sonoma Co.	401	17	293	73	108	27	-	-	-	-
Total	2,360	100%	1,241	53%	984	42%	115	5%	19	1%

Sources: San Francisco Planning Department, Ed Green, Transportation Section; Unpublished data from SPUR High Rise Study; Keyser Marston Associates

Within roughly two blocks of the site, one office building is in the construction phase and another has received certification of its EIR but construction is uncertain. The partially completed building is on the northeast corner of California and Sansome. It will be 23 stories, contain 348,000 sq.ft., and be occupied by approximately 1100 persons. The building whose EIR has been certified is proposed for the southeast corner of Second and Market, it will have a gross floor area of 428,000 sq. ft. and will be occupied by an estimated 2665 persons. Table 9 gives the estimated transit/non-transit split for the future occupants of these buildings along with the split for the occupants of the proposed building.

TABLE 8  
PLACE OF RESIDENCE AND MODAL SPLIT OF EMPLOYEES OF PROPOSED PROJECT

	Location																
	San Mateo/ Santa Clara Counties					East Bay					Marin/Sonoma Counties				Total		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Number of Employees																	
'Worst Case'	968	41%	401	17%	231	17%	590	25%	340	25%	401	17%	231	17%	2,360	100%	1,360 100%
'Developer's Estimate'	558	41%															
Mode of Travel																	
<u>Auto</u>																	
'Worst Case'	281	29%	162	29	325	81%	187	81	342	58%	197	58	293	73%	169	73	1,241 52%
'Developer's Estimate'																	715 53
<u>Transit</u>																	
'Worst Case'	552	57	318	57	76	19	44	19	248	42	143	42	108	27	62	27	984 42
'Developer's Estimate'																	567 42
<u>Walk</u>																	
'Worst Case'	116	12	67	12	-	-	-	-	-	-	-	-	-	-	-	-	116 5%
'Developer's Estimate'																	67 12
<u>Other</u>																	
'Worst Case'	19	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19 1%
'Developer's Estimate'																	11 2
Total																	
'Worst Case'	968	100%															2,360 100%
'Developer's Estimate'	558	100%															1,360 100%

Sources: San Francisco Planning Department, Transportation Section, Ed Green; unpublished data from SPUR High Rise Study,  
Keyser Marston Associates.

TABLE 9

TRANSIT/NON-TRANSIT SPLIT OF PROPOSED BUILDING AND BUILDINGS  
PLANNED AND UNDER CONSTRUCTION WITHIN A TWO-BLOCK RADIUS OF  
BUSH AND MONTGOMERY STREETS

<u>Modal Split</u>	<u>Proposed Project 180 Montgomery</u>	<u>California &amp; Sansome</u>	<u>Second &amp; Market</u>	<u>Total</u>
Number of Employees Added to Site	2,360	770	1,083	4,183
Transit	984	438	587	1,996
Non-transit (Auto)	1,241	332	496	2,187

Sources: Final Environmental Report, Bank of Tokyo of California Building, op. cit.; Draft Environmental Impact Report, (EE74.322), 595 Market Street, San Francisco Department of City Planning, December 1975.

## 2. Impact on Ridership

The increase in transit ridership induced by the project<sup>1</sup> would be approximately 984 round trips per day. Most of these would be Muni trips, although some would be on AC Transit, BART, Southern Pacific, Greyhound, and Golden Gate Transit. Since the Southern Pacific and Greyhound depots are several blocks from the site, many users of the site would use Muni to reach the depots. Therefore, Muni ridership would be approximately 628 round trips per day. Approximately 552 trips would be by San Francisco residents and 76 trips would be by building occupants taking the Muni to the other transit depots (see Table 8).

---

1. Note that this is based on 100% of the 2360-person occupancy of the proposed building, as present occupancy of the existing building is negligible. However, if the existing buildings were fully occupied, the net increase in proposed population would be only 1920 persons, a decrease of 19%.

The 22 Muni lines listed on Tables 3A and 3B, pages 42 and 43, serve the site. The aggregated observed morning peak capacity of these lines is approximately 18,000 patrons and the aggregated observed afternoon peak capacity is approximately 17,000 patrons. In the morning these lines operate at approximately 84% of their aggregated observed capacity, and in the afternoon at approximately 87% of aggregated observed capacity. The 628 patrons which the project would add to these lines in the morning and the afternoon would result in approximately a 3.4% increase in the morning aggregated patronage and a 3.6% increase in the afternoon aggregated patronage.

While these increases in patronage would not cause the aggregated observed capacities of these lines to be exceeded, schedule changes by Muni would be required to increase the individual capacities of the lines serving the site to avoid overcrowding those lines by the impact of the proposed building with the other buildings under development near the site (see Table 9). If such schedule changes were not made, the combined impacts of those projects would cause the 2, 2x, 31 and K lines to further exceed their observed capacities in the morning peak, and in the afternoon peak would result in the 2, 2x, and 31 lines further exceeding capacity and 15, 30, 30x, 45, L, M, N lines beginning to exceed observed capacity.

By the time the project would be completed, Muni expects to increase the capacity of the station lines (J, K, L, M, N) by approximately 50% through the completion of the "Muni Metro."<sup>1</sup>

Work transit trips originating in the East Bay would have an impact upon BART and AC Transit. Due to the proximity of the Montgomery Street BART station (two blocks from the site), it is assumed that the majority

---

1. San Francisco Public Utilities Commission, James Finn, Director of Transportation.

of East Bay trips would be made by BART. Although afternoon peak hour service on BART presently exceeds seated capacity, BART expects additional equipment to be put on line and headways to be reduced during the next two years which should increase the seated capacity. (Contrary to its projections, BART slightly increased headways recently.) The additional 248 trips (even all 248 to BART) would not have a significant impact on the system.<sup>1</sup>

Golden Gate Transit states that in order for them to serve the 108 additional round trips which would be generated by the project the system would be required to purchase 2.6 new buses, which would have an annual operation cost of approximately \$100,000. This is based upon their assumption for planning purposes that all of the new riders generated by the project would wish to ride on lines presently at operating capacity.<sup>2</sup>

Transit service to San Mateo and Santa Clara counties is provided by Greyhound, Southern Pacific, and to Daly City by BART. Greyhound and Southern Pacific are presently operating with excess capacity. BART trains serving Daly City from the Montgomery Street station now exceed seated capacity during the afternoon peak period. An increase of 76 persons would not have a significant impact on these systems.

### 3. Private Vehicles

Approximately 1241 of the persons who would occupy the proposed building would use private auto transportation to and from the site.

- 
1. Conversation with Bill Hein, Director of Planning, BART, December 23, 1976.
  2. Conversation with Jerome Kuykendall, Assistant to General Manager for Planning and Research, Golden Gate Bridge, Highway, and Transportation District, January 7, 1977.

Using the San Francisco factor of 1.3 persons per car,<sup>1</sup> the proposed building would generate approximately 955 new private auto round trips each day.

It is estimated that 85% or 812 of these trips would be made during peak periods and the remaining 143 or 15% of the trips would be made during non-peak periods. These percentages are based on the assumption that the proposed building would be occupied by professional firms which would provide some of their services outside their offices (e.g., lawyers - in court, accountants - at the location of an audit, others - "in the field," etc.) and that the working schedules of some employees would allow them to arrive or leave during non-peak periods.

Of the estimated 812 new trips by private auto during the peak periods, it is estimated that one-third would be made to or from parking garages/lots within the immediate vicinity of the Montgomery-Bush site, the remaining two-thirds would probably use parking facilities on the fringe of the downtown area.

Of the 271 vehicles which would be leasing parking garages/lots in the immediate vicinity of Bush and Montgomery during the afternoon peak, it is estimated that 25% or 68 of them would use Montgomery Street and 25% or 68 would use Bush Street.

These additional private vehicles would increase the afternoon peak traffic count on Montgomery Street of 984 (see Table 4) by approximately 6.8%, increasing its flow from approximately 66% of its

---

1. Factor from Ed Green, Transportation Planner, San Francisco Department of City Planning. Mr. Green comments this factor may be high for the project as the higher-income professionals for which this building is planned tend to have more single-occupant auto trips than the city average, but no specific data are available to make a more accurate estimate.

capacity<sup>1</sup> to approximately 70% of its theoretical capacity. The service level<sup>2</sup> would remain at level A. As defined by the Highway Capacity Manual<sup>3</sup> this level of service represents a condition where there are no vehicles waiting longer than one red light.

The afternoon peak count of 1209 (see Table 4) on Bush Street would be increased by approximately 5.5%. This increased flow would raise its percent of capacity from approximately 81% to approximately 86%. At this level drivers may occasionally have to wait for more than one red light to proceed through the intersection.

The remaining 541 private vehicles leaving during the afternoon peak would be dispersed among other routes leaving the central business district.

The two office buildings not yet completed near the site would not tend to significantly increase the number of vehicles using Bush and Montgomery streets because more direct means of egress are available to them.

- 
1. Capacity is the maximum number of vehicles which a street approaching an intersection can accommodate. At capacity there may be long lines of vehicles waiting upstream from the intersection for a green light and it may take several green lights before one can get through the intersection. (Based on Highway Capacity Manual, see below.)
  2. Service levels are an attempt to describe intersection traffic conditions in terms of driver satisfaction. The levels are based on the load factor of the intersection. The load factor is the ratio of the number of green lights which are completely utilized by traffic to the total number of green lights available to traffic for the same period. The greater the number of loaded green phases in a period of time, the higher the probability that a driver will have to wait more than one green light to proceed through the intersection, and the less freedom the driver of a vehicle will have to negotiate through traffic. The higher the load factor, the lower the level of service. The highest level of service is A, the lowest is F. (Based on Highway Capacity Manual, see below.)
  3. National Academy of Sciences-National Research Council, Division of Engineering and Industrial Research, Highway Research Board, Highway Capacity Manual, Washington, D.C., 1965, Chapter 6, p. 129.

#### 4. Parking

Sufficient capacity does not exist in off-street parking facilities near the site to absorb the 955 private automobiles which would be generated by the project, assuming a building population of 2360 persons. The survey of off-street parking facilities which was conducted for this report found that there is only enough space in the existing facilities to accommodate approximately 830 additional automobiles. The number of spaces which would be available at the completion of the proposed project would probably be less than 830 since some of the presently available spaces will have been taken by the private automobiles generated by the California First Bank Building presently under construction and the 595 Market Building if it is developed.

However, high parking costs and traffic congestion in this central area encourage many auto users to park on the periphery of the downtown area rather than here. We estimate that one-third would choose to park nearby, with the remaining two-thirds choosing to park on the fringe of the finance and administration district where parking rates would be lower. Capacity does exist in this central four-square-block area to accommodate one-third of the autos generated by all three buildings, and, in fact, users would probably tend to scatter to a larger area than even this.

Since much of the parking on the fringe of the finance and administration district is located on sites scheduled for future development, the number of spaces available for parking would diminish in the future. This would probably lead to an increase in parking rates, causing some individuals to reexamine their mode of transit to work, with it being probable that some would switch to public transit. Such a change would

be consistent with the objectives of the Transportation Element of the San Francisco Comprehensive Plan.<sup>1</sup>

#### 5. Service Vehicles

The proposed building would generate 12 to 15 service vehicle trips each day. The number of these trips would vary, since their frequency would be dependent upon the individual characteristics of the building's tenants.

A truck loading area is planned on the Bush Street side of the proposed building. Vehicles exiting this service area would turn into the flow of one-way traffic east of the intersection of Bush and Montgomery streets and thus not impede turning movements or pedestrians at the intersection.

#### 6. Pedestrian Access and Impact

The plan of the building provides for one pedestrian entrance to the office tower, to be located on Montgomery Street. (See Figure 3, page 8). Separate entrances are provided for the two retail areas.

Arthur D. Little conducted two pedestrian counts at the site; one during a Tuesday lunch peak period (12:00-1:00 p.m.) and one during a Tuesday afternoon peak period (3:30-4:30 p.m.). From these counts it was found that the higher period of pedestrian movement at the site was during the lunch peak period. Two thousand and nine persons were counted on Montgomery Street and 1452 were counted on Bush Street during this

---

1. City of San Francisco, Department of City Planning, Transportation Element of the San Francisco Comprehensive Plan, op. cit.

period. Since it is the period of greatest pedestrian flow and as such the period most sensitive to increases in flow, this pedestrian impact analysis will focus on the lunch peak period.

From 12:00 to 1:00 p.m., it is expected that approximately 2360 persons, an amount equal to 100% of the population of the building, would leave and return to the building by the Montgomery Street entrance (less than 100% of building tenants, but including some visitors).

The immediate impact of these trips to and from the building would be on the Montgomery Street sidewalk, directly in front of the building. Based upon the above-mentioned pedestrian count, the existing average flow at this location is 6.7 PFM.<sup>1</sup> During the counting process, peaks were observed where the flow ranged upwards to approximately 20 PFM. When combined with the 20-foot widening of the sidewalk proposed as part of this project, the addition of 4720 pedestrian-trips during the lunchtime peak period would result in an increase of 5.9 PFM in average flow volume of pedestrians directly in front of the building, resulting in a flow of 12.5 PFM. As in the existing case, peaks with higher flows would occur.

---

1. PFM - Pedestrians per foot width of walkway per minute. For a further explanation of PFM and for descriptions of level of service at different PFM's see: John J. Fruin, Pedestrian Planning and Design, Metropolitan Association of Urban Designers and Environmental Planners, Inc., 1971, Chapter 4.

Of the two sidewalks adjacent to the site, the east Montgomery Street sidewalk is the heavier traveled during the lunch peak period. It provides direct access to Market Street and other streets which lead to major transit lines, retail stores, and restaurants. Like the existing office workers in buildings near the site, occupants of the proposed building would be expected to use Montgomery Street during their lunchtime journeys.

The impact of the project on the existing Montgomery Street sidewalk south of the site was assessed using three different flow assumptions. As there are eight different sidewalk routes serving the building (i.e., one on each side of each of four streets leading from the intersection), a minimum of one-eighth or 12.5% of the building's pedestrians should use this particular sidewalk. The flow would probably be greater due to the activities accessed by the Montgomery Street route, perhaps twice or even three times greater. Increased flows on this sidewalk due to 12.5%, 25%, and 37.5% of the proposed building's pedestrians and the resulting PFM are shown in Table 10.

TABLE 10

ESTIMATED INCREASES IN THE EXISTING EAST SIDE OF  
MONTGOMERY STREET SIDEWALK SOUTH OF THE SITE  
PEDESTRIAN FLOW: IF PROJECT WERE BUILT  
(BASED ON 12:00 p.m.-1:00 p.m. AFTERNOON PEAK)

% of Proposed Building's Occupants Who Would Use Sidewalk	Number of Persons	Existing PFM	New PFM	Increase in PFM
Level 1 - 12.5%	590	6.7	8.6	1.9
Level 2 - 25.0%	1,180	6.7	10.5	3.8
Level 3 - 37.5%	1,770	6.7	12.5	5.8

Since the Bush Street sidewalk adjacent to the site is not as heavily traveled as the Montgomery Street sidewalk (fewer retail activities lie in this direction), it is assumed that a maximum of 12.5% of the building's occupants would use this sidewalk during the lunch peak period. Based on this assumption, the average pedestrian volume would reach a maximum of 1.4 PFM immediately adjacent to the site, where the sidewalk would be expanded, and would reach a maximum of 3.1 PFM east of the site where the sidewalk would remain at its present width. During the lunch period, peaks would occur during which the pedestrian volume would rise temporarily above 3.1 PFM.

Because the increase in pedestrian volume would be offset by the expansion of the sidewalks, the sidewalk areas immediately adjacent to the proposed building would not experience a change in their level of service. The area of these sidewalks would allow pedestrians to choose their own walking speed, to bypass slower pedestrians, and to avoid crossing conflicts with others. The Bush Street sidewalk immediately west of the site would provide a similar level of service.

The Montgomery Street sidewalk immediately south of the site would receive the greatest increase in pedestrian volume. Presently it has the same level of service characteristics as the sidewalk areas described above. If the volume is increased by 12.5%, pedestrians would have a more difficult time setting their own walking speed since it would be more difficult to pass slower pedestrians. If the volume is increased 25% or greater, freedom to set one's own walking speed and to pass slower pedestrians easily would be severely restricted. There would be a high probability of conflict with oncoming persons requiring frequent adjustment of speed and direction to avoid contact.

## 7. Construction Impacts on Traffic, Transit, and Pedestrians

Peter Woo of the Bureau of Traffic Engineering, Department of Public Works estimated that, based on previous projects, the sidewalks and one-half of the curb lanes of Bush Street and Montgomery Street would be closed during the 20-month construction period. This area would allow room for the storage of materials and operation of equipment, and would act as a buffer which would protect passing pedestrians and vehicles in the event of any falling objects. The developer would be required to build a wall and covered walkway in the remaining one-half of the curb lanes which would protect passing pedestrians and vehicles from demolition and construction activity. The temporary walkway would be one-half the width of the existing sidewalks.

The narrowing of these streets and sidewalks would reduce Bush Street from approximately 40 feet in width (two 10 feet wide traffic lanes and one approximately 20 foot wide lane which accommodates both traffic and a bus stop) to approximately 30 feet in width. If the bus stop adjacent to the site on Bush Street were relocated during the construction period, the reduction to a 30 foot street width would not require the abandonment of any traffic lanes. The narrowing of Montgomery Street would reduce the width of the street immediately from approximately 40 feet to approximately 35 feet. This narrowing would cause the number of traffic lanes to be reduced from four to three. The sidewalks on both streets would be reduced in width by approximately one-half, which would cause their level of service to diminish if there were no reduction in flow. During peak periods some pedestrians and motorists would seek alternate routes, thereby increasing the vehicle and pedestrian traffic on those routes.

Any deliveries of equipment or supplies would have to be made directly to the site via Bush Street. No back-up of trucks or equipment on Bush Street would be allowed by the City<sup>1</sup> although inevitably some delays in traffic would occur on Bush Street because of trucks entering and leaving the site.

All of the above points would have to be discussed by the developer with appropriate City departments before any work would be allowed to begin.

#### H. AIR QUALITY

The air quality impacts of the project are primarily the effect of vehicular emissions on regional air quality, particularly oxidant formation, and on local pollutant concentrations, particularly carbon monoxide.

The project is estimated to generate the following vehicle-miles of travel, and based on Bay Area Air Pollution Central District (BAAAPCD)<sup>2</sup> factors, the listed quantities of emissions:

TABLE 11  
ESTIMATED VEHICLE MILES

<u>Residence of Building Occupants</u>	<u>Est. Week Day Motor Vehicle Round Trips Generated by Project</u>	<u>Estimated Mileage of Round Trip</u>	<u>Est. Vehicle Miles Traveled Per Weekday</u>
San Francisco	216	x 10	= 2,160
San Mateo Peninsula	250	x 40	= 10,000
East Bay	263	x 40	= 10,520
Marin/Sonoma Co.	226	x 40	= 9,040
Total	955		31,720

1. Conversation with Peter Woo, Bureau of Traffic Engineering, Department of Public Works, based on requirements placed on previous construction projects, August 1976.
2. BAAAPCD, Guidelines for Air Quality Impact Analysis, 1975, based on an average trip speed of 20 miles per hour.

TABLE 12

ESTIMATED DAILY VEHICLE EMISSIONS  
GENERATED BY THE PROJECT

<u>Pollutants</u>	<u>BAAPCD 1980 Emissions Rates</u>	<u>Project Vehicle Miles Per Day</u>	<u>Metric Tons/Day</u>		<u>Project/Basin Emissions %</u>
			<u>1980 Emissions from Project</u>	<u>Est. 1980* Bay Air Basin Em.</u>	
Carbon Monoxide	16.8	31,720	0.533	2,500	0.021
Organics	2.4	31,720	0.076	950	0.008
Nitrogen Oxides	2.8	31,720	0.088	750	0.012
Sulfur Oxides	0.18	31,720	0.006	700	0.001
Particulates	0.28	31,720	0.009	200	0.004

\*BAAPCD, Source Inventory of Air Pollutant Emission in the San Francisco Bay Area, 1973.

As seen in the above table, vehicular emissions generated in the region by the proposed project are estimated to increase air basin emissions of organics and nitrogen oxide by 0.021% and 0.008%, respectively, based on BAAPCD 1980 emission rate expectations. This could increase if technological modifications to vehicles do not occur as anticipated.

However, the cumulative impact of employment growth in downtown San Francisco, of which this project represents one increment, has greater impact. Employment in the downtown area north of Market Street is projected to increase by 35,000-51,000 jobs in the years 1973-2000. Hypothetically, if the travel patterns used for the proposed project (resulting in 13.4 vehicle-miles/person) and the BAAPCD 1980 vehicular emissions rate were applied to a projected employment growth of 35,000 persons, the additional organics and nitrogen oxides generated would be:

	<u>Additional Persons</u>	<u>Vehicle Mile Person</u>	<u>Add'l Vehicle Miles</u>	<u>Emmission Rate g/mile</u>	<u>Est. Add'l Emissions Metric tons/day</u>	<u>Est. 1980 Emission met. t/day</u>	<u>Add'l Air Basin Emissions %</u>
Organics	35,000	13.4	469,000	2.4	1.13	950	0.118
Nitrogen Oxides	35,000	13.4	469,000	2.8	1.31	750	0.175

These hypothetical emissions represent an impact roughly 15 to 22 times that of the proposed project (based on an employment range of 35,000-51,000 persons compared to the proposed 2330). However, the actual impact is dependent upon factors of place of residence, mode of transportation, and vehicular emissions rates that are subject to substantial variation with time.

Afternoon peak hour vehicle trips were estimated on page 73 to be increased by the proposed project approximately 6.8% on Montgomery Street and 5.5% on Bush Street. Impact on carbon monoxide concentrations on those streets would be proportional, or somewhat greater, because of an increased percentage of trip time that the motor would be idling due to heavier traffic. Street loading would be increased by the proposed project from approximately 66% of capacity to 70% on Montgomery, and from approximately 81% to 86% on Bush.

Existing carbon monoxide concentrations, discussed in Chapter III and in Appendix E, are estimated to exceed state and federal one-hour standards on heavily traveled segments of Bush and Montgomery streets under adverse wind and air stability conditions, assuming EPA 1972 vehicular emissions rates. This condition may be experienced on the order of several days per year, and its likelihood of occurrence would be increased by the proposed project. Assuming BAAPCD 1980 vehicular emissions rates, far lower carbon monoxide concentrations are indicated with no violation of the one-hour standards for this pollutant. Increased emissions resulting from the proposed project would not change this condition as based on BAAPCD 1980 emissions rates.

The total cumulative growth of the downtown would have greater impact, but complex analysis is necessary to determine the extent. New buildings would be in locations scattered through the area, and chosen travel routes through the downtown vary with short-term conditions and city street control measures.

As discussed in the transportation section, data indicate roughly 53% of downtown office employees use private automobiles for home to work travel. Although increasing traffic congestion and increased competition for parking are a constraint to use of automobiles, increased loading on available transit systems is a counter force. Unless particular Muni lines and other transit systems serving the downtown expand capacity to accommodate growth in employment in the downtown area (including that growth related to the proposed project), an increased rate of private auto use with resulting air emissions will be encouraged.

Demolition and construction could result in quantities of airborne particulates. The quantity would be dependent upon the degree of control exercised by the contractor, particularly through wetting down potentially dusty areas and wetting or covering debris on trucks, and would have to be done in accordance with the requirements of the Department of Public Works and as overseen by the Department.

#### I. MICROCLIMATE

Wind tunnel tests were conducted on a scale model of the proposed building to determine its probable effect on wind and pedestrian comfort near the site.

The site currently has low to moderate<sup>1</sup> winds compared to other areas of San Francisco. Winds vary considerably with location near the project; the highest winds are found on the east side of Montgomery Street north of the site. The area is shadowed during all seasons.

---

1. Low to moderate winds are defined as winds of less than 50% of the force of winds experienced at the San Francisco Federal Building location. See Appendix F, section VII, Technical Data and Discussion.

The effect of the proposed building on winds would vary with location, with some areas experiencing increases and others decreases. Winds would be increased close to the site and would decrease along Montgomery Street opposite the site and to its east along Bush Street. The project would increase shadows along Bush Street across from the site in spring, summer, and fall. The plaza area would be shadowed all year.

The project would increase pedestrian discomfort due to chilling by wind.<sup>1</sup> The greatest increase would occur on the north side of Bush Street, where both winds and shadows would increase. Wind forces would be increased by approximately 66% directly in front of the Mills Building entrance. East of the site, comfort would improve due to lighter winds. One bus stop, the block long stop on the south side of Bush Street between Montgomery and Sansome, is affected; wind forces on the stop would be increased in front of the proposed building, but decreased east of the proposed building.

The detailed microclimate impact analysis is provided in Appendix F, page 153.

#### J. NOISE AND VIBRATION

The area in the vicinity of Bush and Montgomery has a daytime ambient noise level of 75 dBA<sup>2</sup> and an ambient average peak noise level of 85 dBA.<sup>3</sup> During the 20-month construction period, erection of the proposed building

---

1. See Appendix F, Table 1, page 170.

2. The dBA is a weighted measure of sound pressure which approximates the human physiological response to noise under conditions which include urban sound levels.

Ambient noise is the all encompassing noise associated with a given environment, being a composite of sounds from many sources, near and far. The ambient noise level is the average ambient noise level which occurs 90% of the time.

3. Ambient average peak is the average of the peak ambient noise levels which occur 10% of the time.

would cause construction noise and vibration. All construction equipment, with the exception of impact tools and equipment (jackhammers, pile drivers, associated compressors, etc.) would have to meet the San Francisco Noise Abatement and Control Ordinance<sup>1</sup> requirements prohibiting any noise in excess of 86 dBA when measured at 50 feet from the equipment.

It is the opinion of Cormac Brady of the Department of Public Works and Robert MacDonough of the Department of Public Health,<sup>2</sup> the city officials responsible for the enforcement of the Noise Abatement and Control Ordinance, that the regulated construction equipment would not add a perceptable amount to the existing daytime ambient noise levels in the vicinity of the site.

The impact tools and equipment, particularly the piledrivers which would be used during the foundation, would have an impact on the surrounding environment. A piledriver operating at a construction site has a noise level of approximately 100 dBA,<sup>3</sup> which would be 15 dBA above the proposed site's peak average ambient level. According to Federal Highway Administration Noise Standards,<sup>4</sup> the standards used by the Department of Public Works, an increase of 10 dBA above the average peak ambient level would result in "great" intrusion on conscious thought and conversation.

With regard to the noise impact on offices adjacent to the site, the noise from the piledriver would be attenuated by the material of these

- 
1. City and County of San Francisco, San Francisco Noise Abatement Ordinance No. 274-72, Section 2907 Construction Equipment, December 4, 1972.
  2. Conversations with Robert MacDonough, Environmental Inspector, San Francisco Department of Public Health, and Cormac Brady, Mechanical Engineer, San Francisco Department of Public Works, December 22, 1976.
  3. Cormac Brady, ibid.
  4. Federal Highway Administration, Federal Highway Program Manual, Vol. 7, Chapter 7, May 14, 1976

buildings by approximately 20 dBA,<sup>1</sup> resulting in a noise level from the piledriver of approximately 80 dBA. The average office has an ambient noise level of 70-75 dBA.<sup>2</sup>

#### K. BIOTA

Landscape for the proposed plaza area is expected to include plant material, but the character of landscaping has not been determined at this time. Selection of suitable species would be difficult due to the wind exposure and lack of sunlight in the proposed plaza. Street trees on the Montgomery Street side of the site would be removed during the construction period, but replaced in the final phase. No landscaping anticipated would be a likely habitat for animal species.

#### I. ENERGY USE

The connected kilowatt load of the project is estimated by the project architect/engineer at 5400 kilowatts. The estimated average kilowatt hours of monthly consumption required to service all electrical needs: (1) in absolute amount are estimated at 620,000 kWh, and (2) per square foot interior space are estimated at 1.6 kWh. Anticipated daily and annual electrical load distribution curves are shown in Figure 18.

Estimated average consumption of fuel oil (fossil fuels) in British Thermal Units (BTU's) per square foot of interior floor space per day is estimated by the project architect/engineer as 123 BTU/square foot/day.

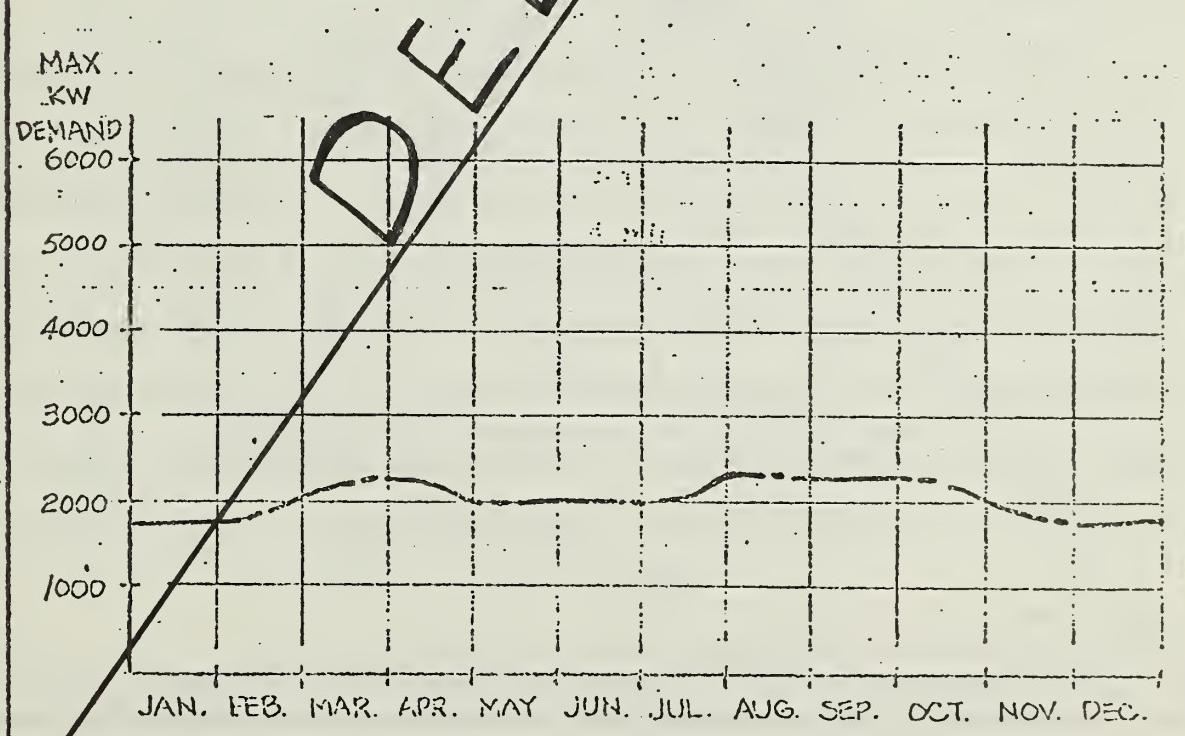
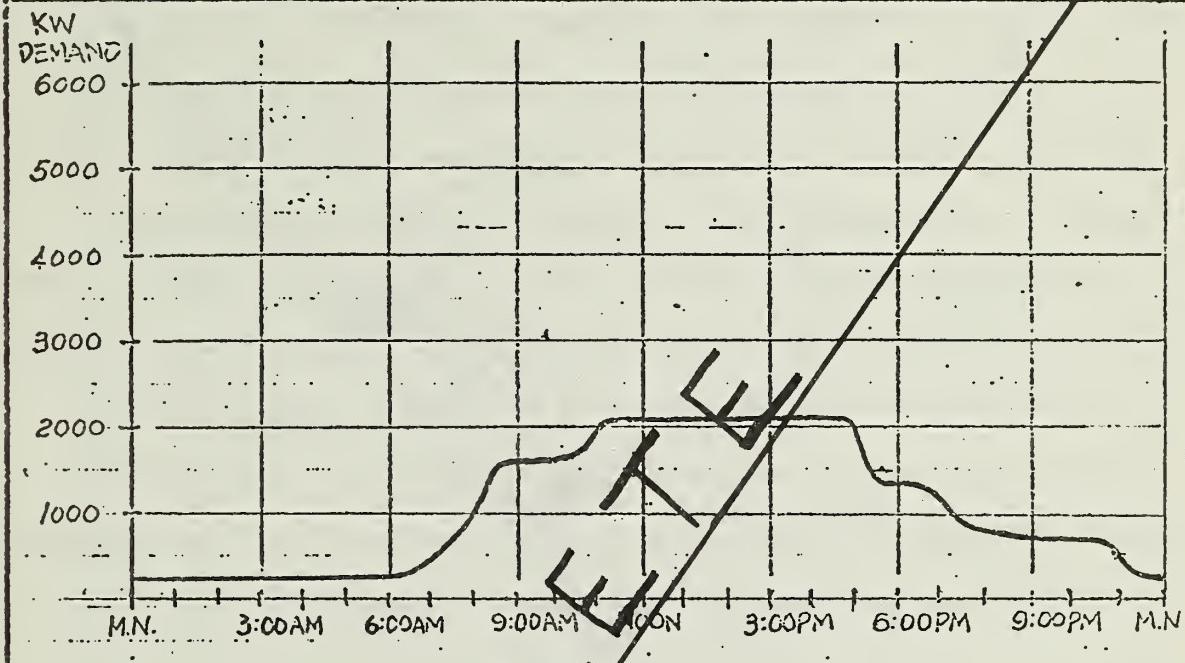
~~The maximum peak demand of fossil fuel consumption would be 8 million BTU/..~~

- 
5. Robert MacDonough, op. cit.
  6. Robert MacDonough, ibid.

FIGURE 18

ANTICIPATED DAILY AND ANNUAL ELECTRICAL  
LOAD DISTRIBUTION

BUILDING PROPOSED HINES OFFICE BLDG. S.F.	MADE BY EPL	DATE 7/14/76	JOB NO. 11437-00
SUBJECT EIR CHARTS ELEC. LOAD DISTRIB.	CHECKED BY J.S.	DATE 7/14/76	SHEET NO. 1 OF 1



hour Anticipated daily and annual load distribution curves for fuel

oil consumption are shown in Figures 19 and 20. Use is primarily for space heating and hot water.

Since the mechanical and electrical systems for the proposed building have not yet been designed, the engineers have derived the data by extrapolation from the California First Bank Building<sup>1</sup> being built at California and Sansome streets<sup>2</sup>, also designed by Skidmore, Owings & Merrill, Architects-Engineers, and from PG&E meter readings of several existing local office buildings adjusted for this project. The proposed building is 11% larger than the California First Bank Building, the conversion efficiency of oil is 11% less than gas (the fuel used in the California First Bank Building), and the proposed building is estimated to be 11% more energy efficient than the California First Bank Building. The worksheets of the engineers are contained in Appendix G, page 187.

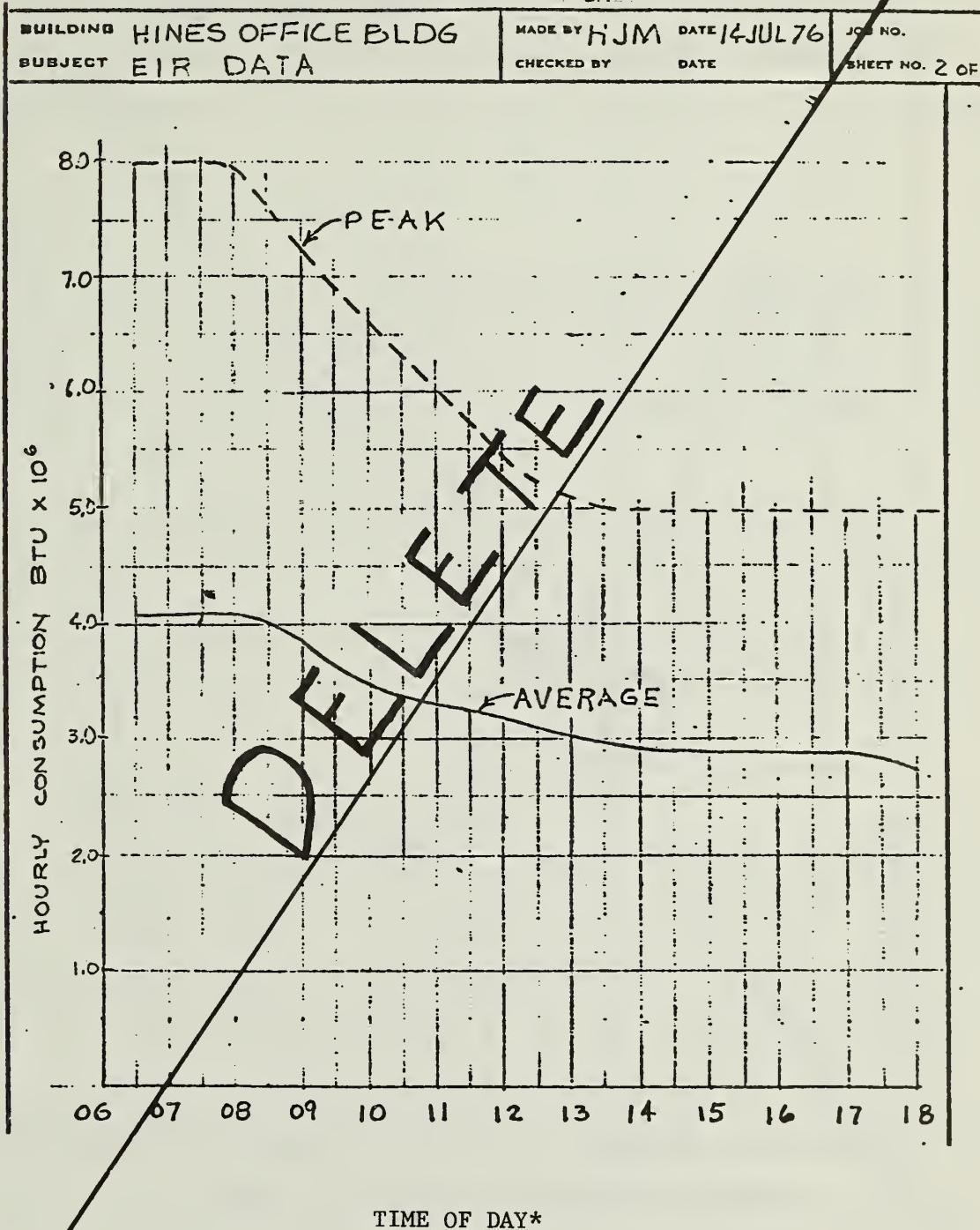
#### M. WATER USE

Water would be required for domestic use such as sanitation, drinking, and cooling tower operation. The project architects/engineers, Skidmore Owings & Merrill, on the basis of their experience with similar buildings, state that they expect the proposed building to consume approximately 15 gallons of water per day per building occupant. This results in approximately 35,000 gallons of water per day that would be required to serve 2360 occupants of the proposed building. In addition, the design engineer calculates that the cooling system will consume from zero to 12,000 gallons per

- 
1. Final Environmental Impact Report EE 74.170.
  2. This extrapolation was discussed with Alec Bash of the Office of Environmental Review, July 1976.

FIGURE 19

## DAILY FUEL OIL DISTRIBUTION CURVE

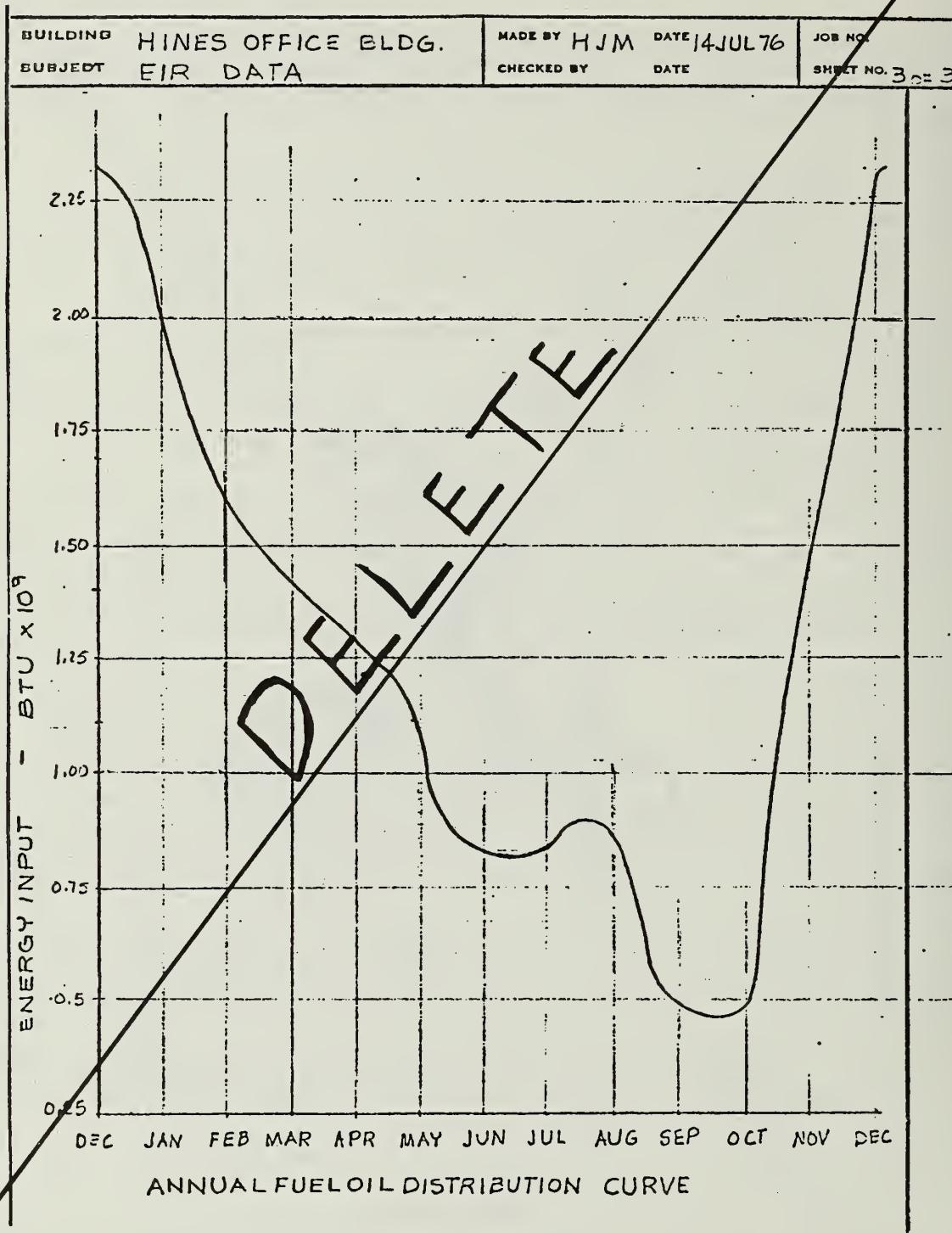


\*Design assumes that the heating/cooling system will operate only on a 0600-1800 basis and no fuel oil will be consumed at night. This assumption will be revised only if energy consumption is thereby reduced.

Source: Skidmore, Owings & Merrill, Architects & Engineers.

FIGURE 20

## ANNUAL FUEL OIL DISTRIBUTION CURVE



Source: Skidmore, Owings &amp; Merrill, Architects &amp; Engineers

~~day of water, depending on the level of operation and the weather. This~~

~~cooling consumption would be the result of losses due to evaporation,~~

~~wind drift, and periodic bleeding of the system to reduce mineralization.~~

~~Total consumption is therefore estimated to vary from 35,000 to 47,000~~

~~gallons per day.~~

~~DELETE~~

#### N. SURFACE AND GROUNDWATER

The site is presently covered by buildings; no changes in drainage and runoff are expected as a result of replacement of the existing buildings by the proposed building. Runoff would continue to be directed into the city's combined storm-sanitary sewer system.

As site excavation would be limited to the depth required for a single basement and the foundations, the developer's consultants expect groundwater problems during construction to be limited. Any water that does enter the excavation would be pumped into the storm-sanitary sewer system.

#### O. LIQUID WASTES

The project architects/engineers, Skidmore, Owings & Merrill, on the basis of their experience with similar buildings, state that they expect the proposed building to generate approximately 15 gallons of liquid waste per day for each person employed in the building. This results in approximately 35,000 gallons of liquid waste per day that would be discharged into the city's sanitary sewer system. The discharge will be handled by the North Point Sewage Treatment Plant, and would constitute



buildings by approximately 20 dBA,<sup>1</sup> resulting in a noise level from the piledriver of approximately 80 dBA. The average office has an ambient noise level of 70-75 dBA.<sup>2</sup>

#### K. BIOTA

Landscaping for the proposed plaza area is expected to include plant material, but the character of landscaping has not been determined at this time. Selection of suitable species would be difficult due to the wind exposure and lack of sunlight in the proposed plaza. Street trees on the Montgomery Street side of the site would be removed during the construction period, but replaced in the final phase. No landscaping anticipated would be a likely habitat for animal species.

#### L. ENERGY USE

Preliminary designs for the mechanical and electrical systems for this building were completed in June, 1977, allowing computation of an energy and water consumption profile.

The heating, cooling, ventilating and lighting systems have been designed to be within the criteria of presently proposed energy limitations of California Administrative Code, Title 24.

The lighting criteria is based on 75 foot candles of lighting instead of the historical standard of 100 foot candles. This energy savings also is reflected to air conditioning energy savings. Lighting would also be locally controlled, which would further reduce power use from the calculated demand below.

The air conditioning cooling system would be of variable volume design so that no reheating of cooled air is required. Every other floor would

have its own fan system so that the entire building would not have to be on the line when only portions are occupied. Each fan system would have an economy cycle. When the outside air is 70° D.B. or less, the fan system would deliver 100% outside air since the air is colder than the return air from the occupied spaces. This would reduce the energy demand of the cooling plant progressively until the outside air is 52°. At that point the cooling plant is off the line and all the air conditioning is done by outside air. As the temperature goes below 52°, the outside air would start closing and mixing with return air to maintain the 52° and not add heating load. This would be all done automatically. This operation is comparable to opening outside windows, except that the system also is taking care of internal rooms. The variable volume concept reduces the volume of air supplied in proportion to demand in such a manner that the energy used by the fan motors also reduces.

The Trane Co. of LaCrosse, Wisconsin (one of the oldest and largest manufacturers of air conditioning machinery and systems) has established an air conditioning Economics Computer Program (TRACE) to verify system designs and project an average operating cost. They have in their program the weather records of most cities in the United States, including San Francisco. The design characteristics of the proposed project were run on the TRACE computer program by the project design engineer. Basic system characteristics and consumption findings are tabulated in Appendix G; a copy of the TRACE readouts for this building for the year 1978 is on file in the City Planning Department office.

A summary of this data, based on system operation 12 hours per day

for five days per week shows the average per month electrical usage as follows:

Lighting	264,850 KW
Misc. power (elevators, etc.)	25,963 KW
Heating & air conditioning	<u>157,383 KW</u>
TOTAL	448,196 KW per month, average

This is 13.15 KW per year per gross sq. ft. of the building -- 1.09 KWH per month. The program indicates that the peak electrical demand would be 2198 KW. Anticipated daily and annual electrical load distribution curves are shown in Figure 18.

Heating for this building would be district steam supplied from PG&E, similar to services provided several other office buildings in the area. This steam would be converted to hot water for space heating. In the space above the ceiling on each floor there would be a multiple of supply air fans with hot water heating coils supplying warm air to the perimeter of the floor. Multiple units are installed so heat is only supplied on the exposure that requires it. Since 40% of the heat from the lighting goes into the ceiling space, this heat is captured using the ceiling space air through the fancoil units. The basic hot water would not be opened to each coil until the captured heat from the lights is unable to provide the occupancy comfort. After the steam condenses to hot water, a second use of this energy would be made by supplying it to the heating coils that furnish warm air to the 1st and 2nd floors.

The heating would require, according to TRACE program analysis, 38,202 therms of steam per year with a monthly (January) peak of 5761 therms and minimum month (August) of 1062 therms of steam. The building would require

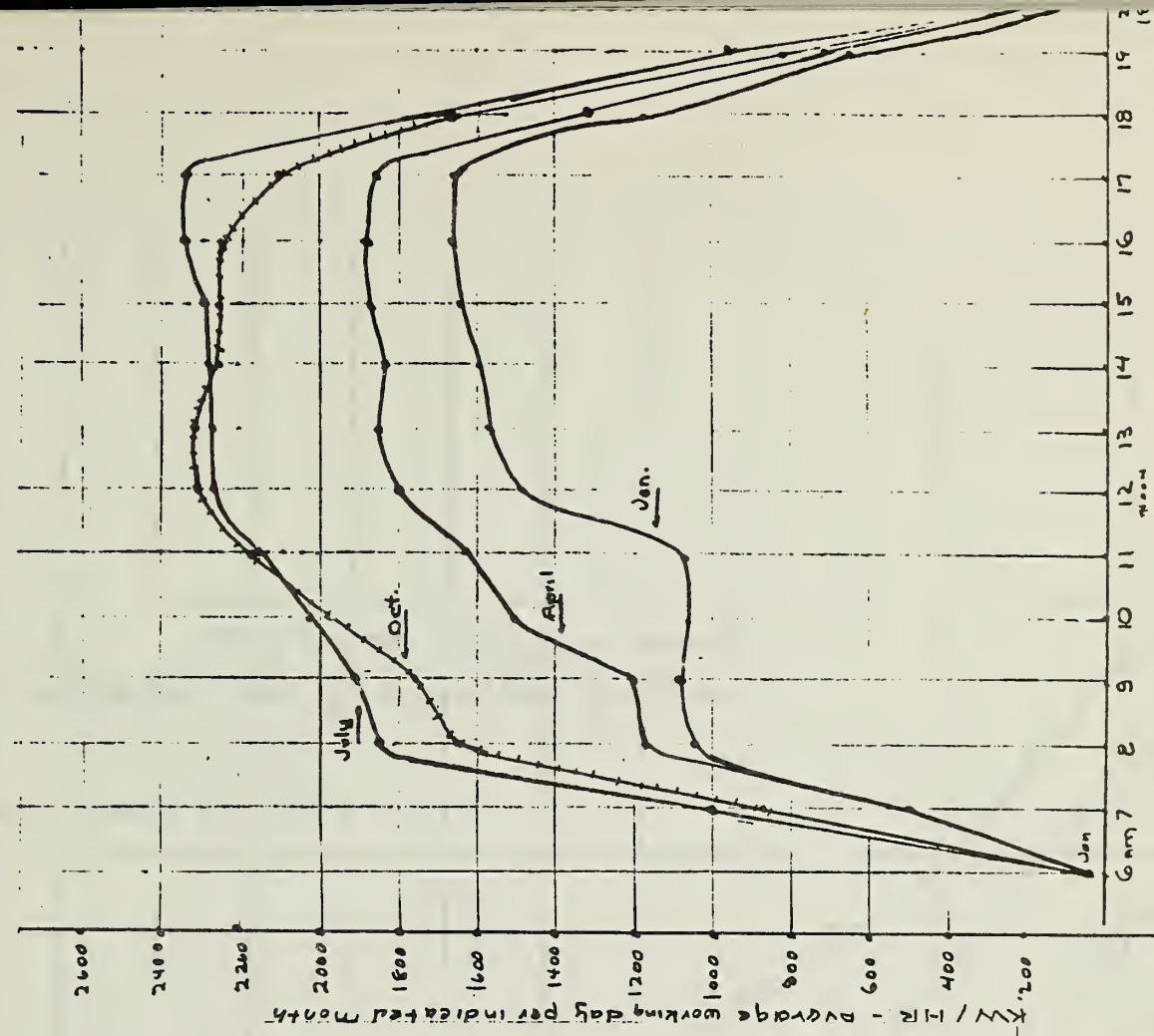
10.82 lbs. of steam per gross sq. ft. per year. Anticipated daily and annual load distribution curves for steam consumption are shown in Figures 19 and 20.

#### M. WATER USE

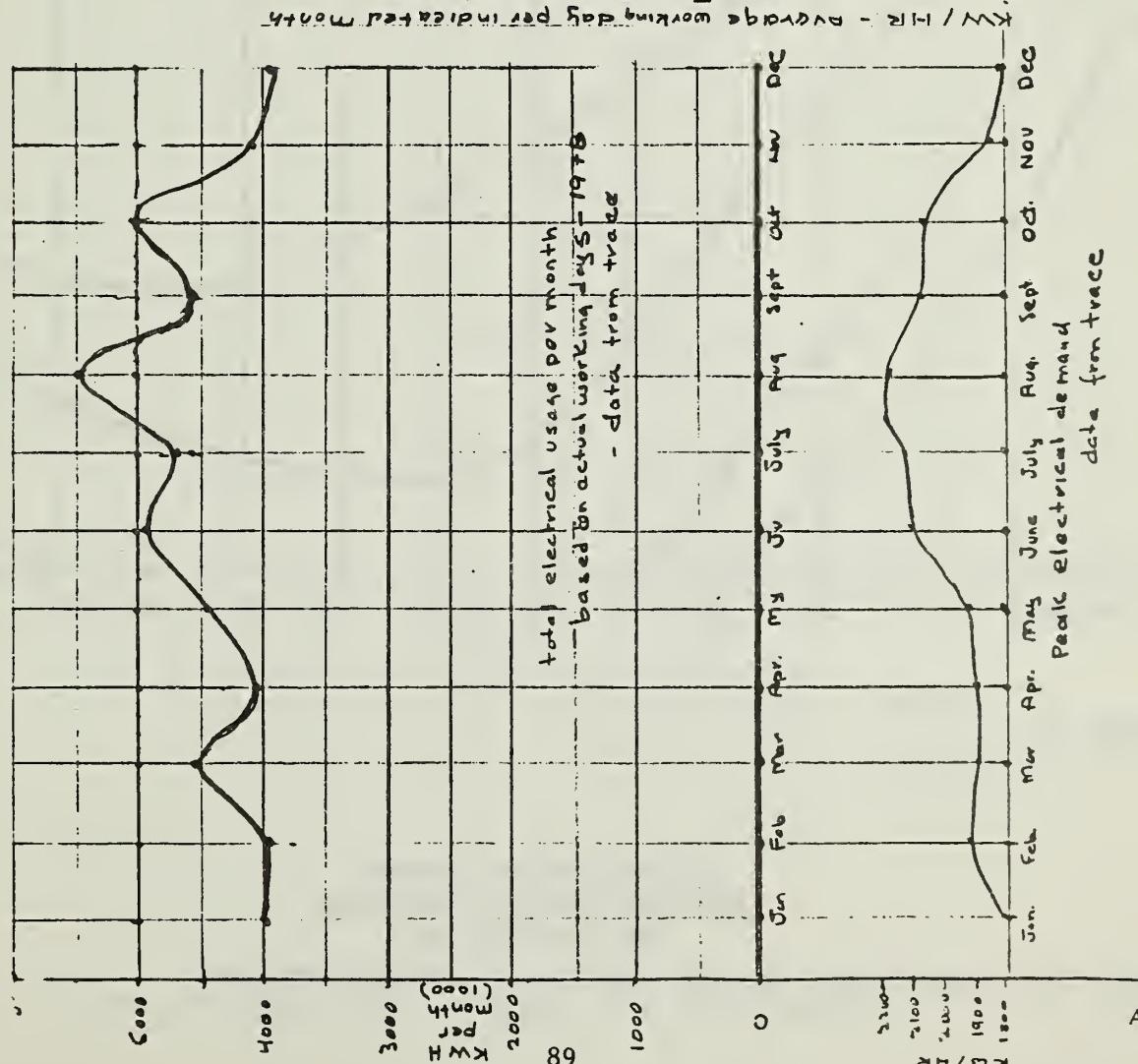
The preliminary designs of mechanical and electrical systems for this proposed building were completed in June, 1977, allowing computation of an energy and water consumption profile in the manner described above under Energy Use.

Water would be required for domestic use such as sanitation, drinking, and cooling tower operation. Sanitation and drinking uses are estimated to require approximately 15 gallons of water per day per building occupant. This results in approximately 35,000 gallons of water per day required to serve 2360 occupants of the proposed building.

Cooling towers on the air conditioning system require a considerable amount of makeup water. Part of this water is the continuous bleedoff to keep the dissolved solids in the tower at a minimum so as not to lime up the equipment. This bleedoff is usually a fixed amount at a 100% cooling operation. A dissolved solid measuring device would be installed to provide only the required amount of bleedoff, depending on the percent of cooling operations (resulting in a savings of 19,500 gallons of water per month on an annual average). The cooling towers would require with fixed bleed an average of 14,500 gallons of makeup water per day. The peak monthly (August) consumption would be 669,000 gallons per month and the minimum monthly (January) consumption would be 91,000 gallons. Use would occur only on working days, when the system was in operation. Daily consumption would



HOURLY ELECTRIC POWER USAGE  
180 Montgomery St. Building  
San Francisco, Ca.



MONTHLY ELECTRIC POWER USAGE  
180 Montgomery St. Building  
San Francisco, Ca.

Source: Air Conditioning Company, Inc; Data from TRACE Program

FIGURE 18

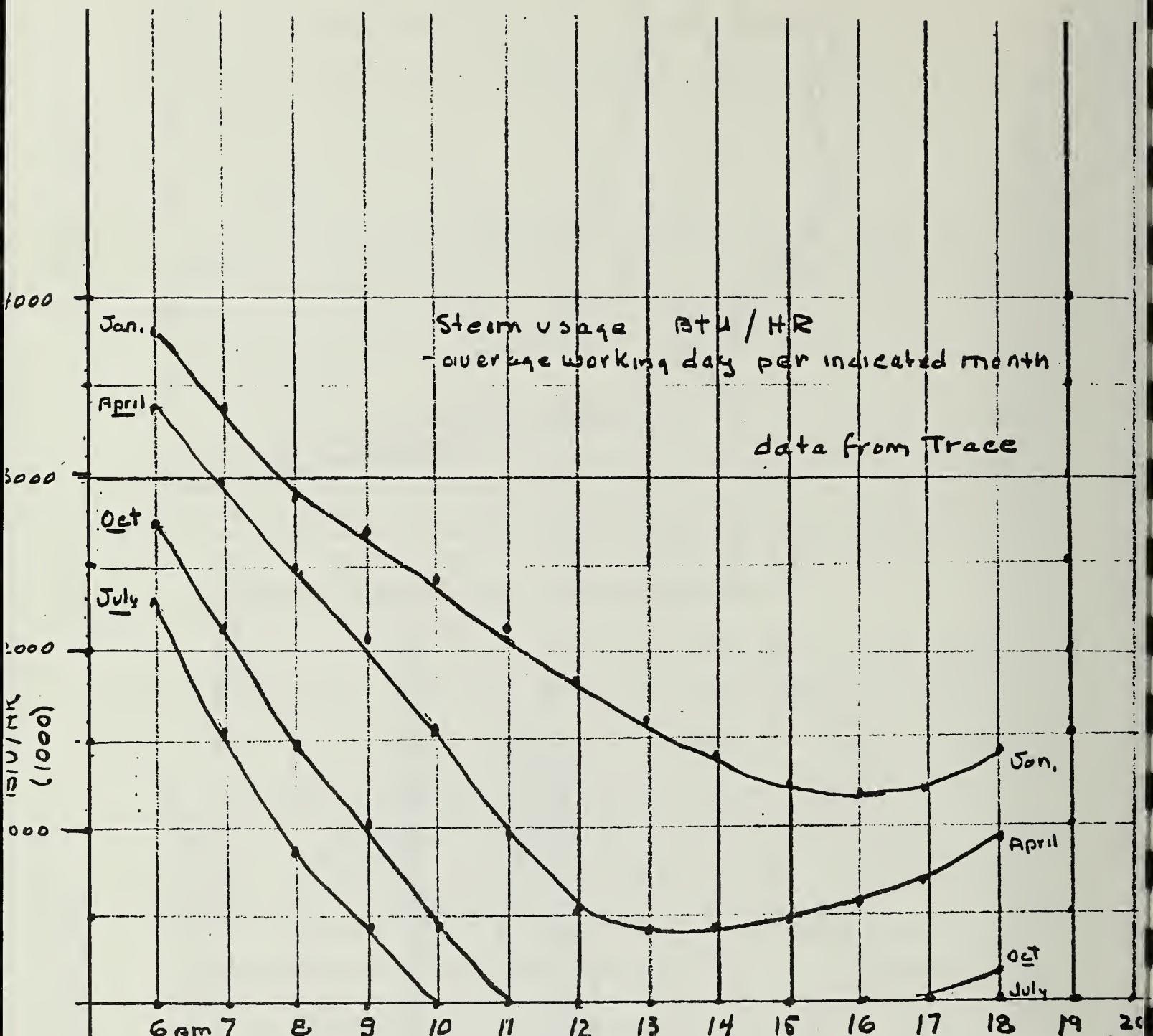


Figure 19

HOURLY HEATING DEMAND  
180 Montgomery St. Building  
San Francisco Ca.

Source: Air Conditioning Company, Inc; Data from TRACE Program

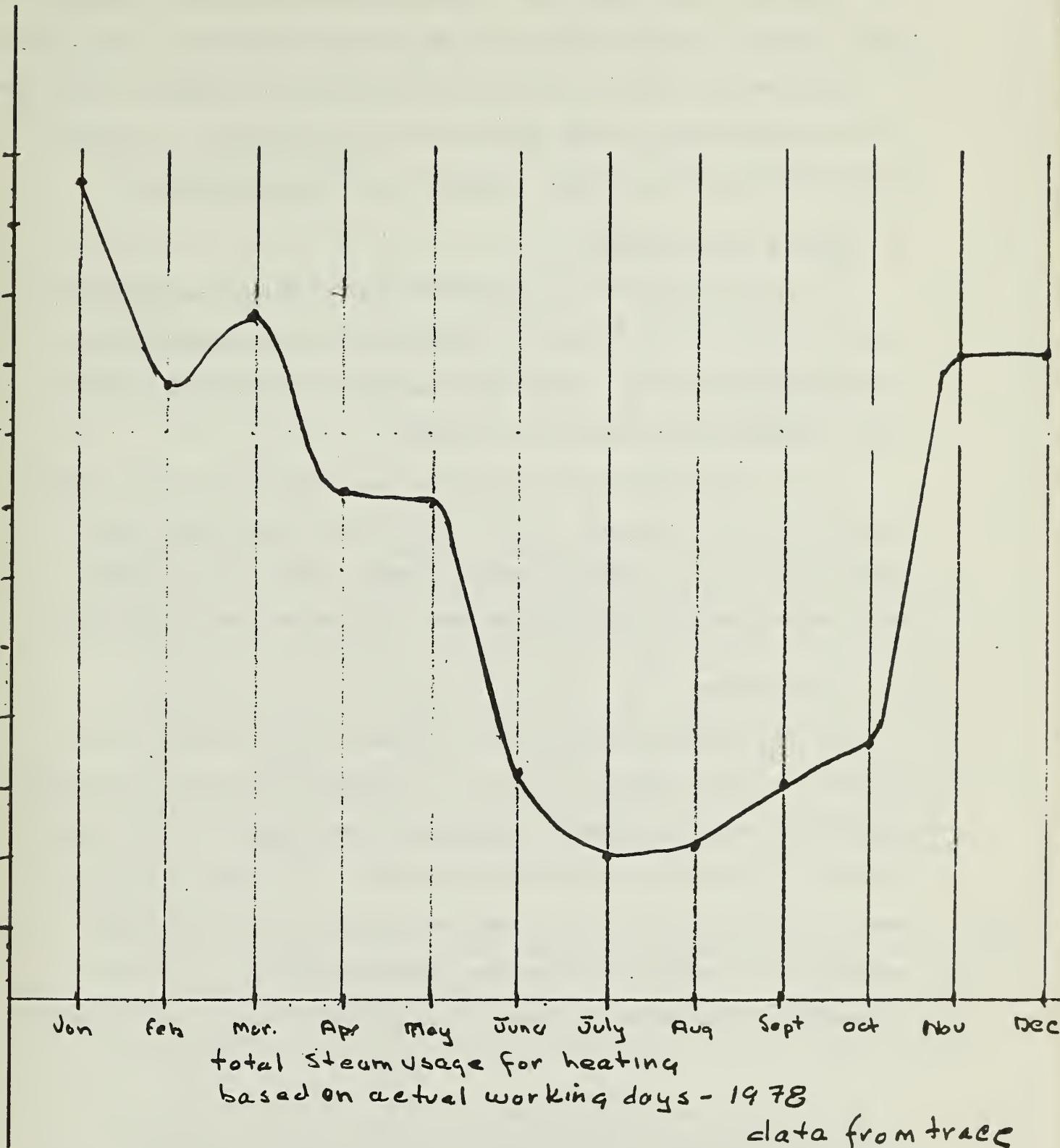


Figure 20

MONTHLY HEATING DEMAND  
180 Montgomery St. Building  
San Francisco Ca.

Source: Air Conditioning Company, Inc; Data from TRACE Program

be approximately 29,000 gallons and 4300 gallons for August and January. A small additional amount of water would be lost due to evaporation and wind drift.

Total water consumption of the proposed project is estimated to range from a high of approximately 64,000 gallons per work day in August to a low of approximately 40,000 in January, responsive to air conditioning load.

#### N. SURFACE AND GROUNDWATER

The site is presently covered by buildings; no changes in drainage and runoff are expected as a result of replacement of the existing buildings by the proposed building. Runoff would continue to be directed into the city's combined storm-sanitary sewer system.

As site excavation would be limited to the depth required for a single basement and the foundations, the developer's consultants expect groundwater problems during construction to be limited. Any water that does enter the excavation would be pumped into the storm-sanitary sewer system.

#### O. LIQUID WASTES

The project architects/engineers, Skidmore, Owings & Merrill, on the basis of their experience with similar buildings, state that they expect the proposed building to generate approximately 15 gallons of liquid waste per day for each person employed in the building. This results in approximately 35,000 gallons of liquid waste per day that would be discharged into the city's sanitary sewer system. The discharge will be handled by the North Point Sewage Treatment Plant, and the discharge would constitute

.06% of its average dry weather flow of 60 million gallons per day.<sup>1</sup> The capacity of the North Point plant is exceeded during rainy weather. During these periods the plant operates at capacity and discharges the excess into the San Francisco Bay at the Main and Howard streets outfall.

The overflows have caused the San Francisco Bay Regional Water Quality Control Board to cite the North Point plant because it does not comply with water quality standards established by federal and state law.<sup>2</sup>

Implementation of the Wastewater Master Plan,<sup>3</sup> which calls for eventual phasing out of the North Point Water Pollution Control Plant, will ultimately lead to substantial compliance with the requirements of

- 
1. Conversation with Lou Vatadoni, Bureau of Sanitary Engineering, Department of Public Works, December 23, 1976.
  2. San Francisco Bay Regional Water Quality Control Board, Cease and Desist Order, Resolutions 67-2, adopted 11/19/67; 73-55, adopted 6/26/73; and 73-54, adopted 9/25/73. Cease and Desist Order amended and new compliance schedules set 12/6/74, Order No. 74-159. Cease and Desist Order No. 76-58 prohibits any new discharges to the sewer system tributary to the North Point Water Pollution Control Plant, meaning that no new sewer connections are allowed while this Order is in effect. Order No. 76-67, dated 6/15/76 lifts this prohibition only for those projects completely processed and awaiting building permits as of 6/15/76. Order No. 76-81, dated 7/20/76 lifted the sewer connection prohibition again only for those projects completely processed and awaiting building permits as of 7/20/76. Order No. 76-92, dated 8/17/76, did the same for projects otherwise processed as of 8/17/76.

Robert Cockburn, Bureau of Sanitary Engineering, Department of Public Works, stated on 3/29/77 that the Order was again amended in February, 1977, setting a new schedule for system development permitting new connections as long as the schedule is complied with. This schedule requires adoption of a City revenue program for the sewer system construction projects by May 15, 1977, and completion of Southeast Plant construction, the last element of the system, by June 23, 1980.

3. U.S. Environmental Protection Agency and City and County of San Francisco, Final Environmental Impact Report and Statement: San Francisco Wastewater Master Plan, May 1974. See also Final Environmental Impact Reports for Implementation Projects I, III, and VIII, for the Wastewater Master Plan.

the RWQCB. When the plant is phased out, dry weather flows from this service area will be transported to the Southeast Water Pollution Control Plant for treatment and discharge, and wet weather flows are expected to be transported to a proposed treatment plant in the southwestern area of the city for treatment and discharge. In the interim the North Point facility will continue to operate as a treatment plant until the Southeast plant is expanded, at which point the North Point plant will operate only during wet weather.

#### P. SOLID WASTES

The amount of solid waste generated by the proposed building for disposal has been estimated on the basis of the California Solid Waste Management Control Board's generation factors of one pound per 100 square feet of floor space or 2.8 pounds per capita per day for metropolitan commercial refuse.<sup>1</sup> Since the application of these factors generates slightly different estimates, the amount of solid waste generated has been given as a range. Based on these factors, the project would generate an estimated 1.8 - 2.0 tons of solid waste per day, or approximately 0.0004% of San Francisco yearly refuse.

Golden Gate Disposal Company, which is under City contract in the project area, would place the waste in a holding area at 501 Tunnel

---

1. California Solid Waste Management Board, Solid Waste Generation Factors in California, Bulletin No. 2, Technical Information Services, July 8, 1974.

Avenue in San Francisco and then transfer the waste to the Shoreline Regional Park Sanitary Fill Project in Mountain View. The existing site accommodates San Francisco through 1980. There currently exists a proposal under review to incorporate a new area which would accommodate San Francisco until 1983.<sup>1</sup>

This amount of solid waste would require daily removal. It would be picked up at the building's service vehicle area, accessed off Bush Street.

Q. POLICE

The San Francisco Police Department estimates that the proposed building would generate 47.4 incidents per year requiring police attendance. Their estimate is based upon the number of incidents reported for 1975 in the Census tract of the proposed site, producing a ratio of 20.09 incidents per 1000 population (combined day and night population peak). They state that "the proposed project could cause an increased demand for police services."<sup>2</sup>

R. FIRE PROTECTION

The San Francisco Fire Department states that there is adequate water supply for fire fighting, that the proposed construction would create no

- 
1. Conversation with Richard Haughey, Assistant Engineer, City of Mountain View, January 6, 1977.
  2. San Francisco Police Department, Environmental Impact Report - Evaluation of Police Services for Arthur D. Little, Inc., July 1976. File Number - PR 396 (available for review at the San Francisco Department of City Planning).

additional need for fire fighters or equipment, and that the impact of the building and its impact in combination with other new and proposed downtown development "will not have an adverse effect on the fire protection services as now provided."<sup>1</sup>

---

1. Letter from Robert E. Rose, Chief, Division of Planning and Research, San Francisco Fire Department (available for review at the San Francisco Department of City Planning).

## V. MITIGATION MEASURES PROPOSED TO MINIMIZE THE IMPACT

### A. SEISMIC HAZARD

If the proposed project were approved, a soils investigation of the site would be made to analyze the specific susceptibility of the site to liquefaction, subsidence, and movement. The information from such a soils analysis would be used with the City's structural design requirements to develop the design for the building. This procedure conforms with Policy Four of the Community Safety Element of the Comprehensive Plan of San Francisco which in part states that ... "Special site investigations should be required in these (geological) hazard areas to determine the actual hazard, if any, for all proposed new development. Based upon the findings of this site investigation and determination of type and degree of (geological) hazard present, appropriate engineering design should be required to ameliorate this (geological) hazard."<sup>1</sup>

### B. HISTORICAL AND ARCHAEOLOGICAL IMPACTS

The historical landmarks plaque would be remounted in a prominent place on the proposed building, as requested by the Landmarks Preservation Advisory Board.

If anything of potential archaeological or historical import is found on the site, the contractor will be legally bound by its contract to stop construction to permit professional evaluation of the finds, in accordance with city environmental guidelines.

---

1. City of San Francisco, Department of City Planning, A Proposal for Citizen Review, Community Safety Plan for the Comprehensive Plan of San Francisco, July 1974, p. 43.

### C. SCENIC, ARCHITECTURAL AND LAND USE IMPACTS

The visual replacement of three existing building facades by one new office building would be mitigated by the developer's proposal to increase street level retail space from 2000 sq. ft. of existing buildings use (prior to purchase) to approximately 4120 sq. ft. Ground floor office uses that existed in the present building would be entirely eliminated. With effort to enhance the character of this retail space in ways that maximize visibility and use by pedestrians on the street (e.g., use of windows, light levels, display design, access) would add color and activity to the street. Provision of a plaza area open to the public as proposed would further add to the pedestrian amenities of the street.

This would be maximized in the view of the City Planning Department if all the retail space were used for shop or eating/drinking type retail activities, and retail banking functions at the street level were avoided. Two thousand sq. ft. of retail banking existed in the Gibraltar Savings and Loan Building prior to purchase, and the developer indicates that allowing retail banking on the street level of the new building is an important incentive to attracting prospective bank administrative office tenants. It is uncertain at this time if any space would be leased to a retail banking function. If it were to occur, the developer and his architectural consultant state that design of the space could minimize "institutional" characteristics and emphasize the color, people, and activity that add interest to the street scene.

Provision of increased areas of retail space by placing it at a second floor or below grade level is possible but constrains its accessibility and use. The developer believes that this would be financially infeasible in this project, and that such a location for a retail banking facility in particular would be unattractive to prospective tenants.

The developer proposes to construct a plaza area open to the public to further add to the amenities of the street. Physical use of the space by people is constrained by access, the fact it is in constant shadow, and by exposure to wind. The position of the plaza is determined by an air-rights easement above the roof level of the existing Title Insurance building and by geometry of the site. Additional visual and physical access may be possible through the larger retail space, however. Wind and chill characteristics could be reduced with the use of protective roof elements (e.g., skylights) at additional cost. However, the City Zoning Administrator must determine if such a measure is allowable and, if implemented, whether it would sufficiently mitigate adverse conditions to ensure a useable plaza. The provision of plaza spaces is encouraged by the City by allowing a "bonus" of additional floor area to be constructed on the site in compensation. Wind impacts on the proposed plaza could also be reduced by placing it below grade, or by placing a glass wall with a door (preferably revolving) on the ground-level passage south of the building between the proposed project and the French Bank Building. Further amenities to encourage public use could include art works, a small food service kiosk, tables, and landscapings.

The detailed design of the face of the proposed building can be executed in a manner that mitigates against peoples' reaction of "cold" and "sterile" new high-rise office buildings contrasted to "warm" and "familiar" old buildings. This is in part a matter of use at street level of elements of human scale, of elements that invite pedestrian interest and visual participation, and of elements that stimulate associated pleasant memories. It is in greater measure a matter of high-quality architectural design. The Project Review section of the City Planning Department would examine the final building design prior to the City issuance of a building permit.

The design of the exterior of the building would conform to City guidelines in general in that light-colored materials would be used, and visually strong, dominant, or contrasting elements in the building facade would not be used, as suggested by the Department of City Planning.

#### D. TRANSPORTATION AND CIRCULATION

The project would not provide parking, which is consistent with the City's plan to limit auto traffic in the downtown area. This goal could be further realized by the City taking action to constrain parking availability or use within or on the edge of the downtown area (e.g., cost increases, prohibition of construction of additional private auto parking facilities).

The developer's representatives would meet with the appropriate City departments to minimize any inconveniences to traffic and pedestrians during the construction period. Efforts that could be devised with the City to speed up the demolition and construction process would lessen the amount of time that portions of Bush and Montgomery Streets would have to be barricaded.

The present plan calls for the widening of the sidewalks from 12 to 32 feet on Montgomery and from 15 to 35 feet on Bush immediately adjacent to the site.

The chosen site is near a variety of transit systems, which mitigates the tendency of higher-income office buildings to increase automobile usage.

#### E. AIR QUALITY

The project discourages automobile usage by not providing parking facilities, thereby tending to reduce the air pollutants resulting from this project.

Airborne dust resulting from construction operations would be abated by wetting or oiling haul roads; by wetting dusty areas during excavating and grading operations, as well as during windy weather; by wetting or covering dusty materials loaded on trucks; and by keeping City streets, sidewalks, streets trees, and other plant material free of dust, mud, load spillages, rubbish, and debris resulting from construction equipment and operations.

#### F. MICROCLIMATE IMPACTS

Reduction of induced wind force at street level typically requires extending a lower floor out in front of the tower element to deflect the wind above the street level, major physical protuberances from the face of the tower to break up the flow of air down the face of the buildings, or major reconfiguration of a complex form or reduction in height to avoid catching and channeling the air initially. The small size and geometry of the proposed site make stepping back the tower impractical. Large projecting elements are undesirable on visual, seismic, and cost grounds. Reduction of building height would tend to proportionally reduce the increase in generated wind forces, but also reduces financial return to the developer.

The provision of a sidewalk area under the building as proposed would provide protection from wind forces to pedestrians at the base of the building. This protected area would also shelter persons waiting for buses at the Bush Street bus stop, which extends the full block between Montgomery and Sansome. Wind forces east of the site along this bus stop would be reduced as a result of the proposed project.

The provision of a sidewalk area under the building as proposed would provide protection from wind forces to pedestrians at the base of the building. Mitigation of wind forces and chill in the proposed plaza area is discussed above under Scenic, Architectural and Land Use Impacts, page 98.

#### G. NOISE IMPACTS

Noise impacts can be mitigated by a variety of techniques including shielding of equipment, installation of mufflers, modification of construction operations, or selection of specific types of equipment to generate minimum noise (e.g., drill or vibrate in piles rather than drive them by impact), and by provision of sound insulating measures at sensitive receivers.<sup>1</sup> If it is determined that a violation of the City noise ordinance exists, representatives of the Department of Public Works would meet with the contractor and determine a method of correcting the problem that is deemed appropriate to the specific conditions. No violation is now anticipated.

#### H. BIOTA

During construction, street trees would be removed from the site. Replacement of these trees and the incorporation of additional landscaping into the final design of the proposed building would enhance the site.

---

1. For further discussion of mitigation measures, see "Construction Noise Control," a document in draft form prepared by the Bureau of Engineering of the San Francisco Department of Public Works.

## I. ENERGY USE

Energy conservation is a primary design objective today, both because of the cost of energy and because of recent legislation that mandates ~~RESPONSIBLE FOR PRELIMINARY PLANNING FOR THE PROPOSED BUILDING~~ servation measures. The ~~building~~ design engineers/ comment below on four specific considerations:<sup>1</sup>

"A. Natural Ventilation: Natural ventilation is impractical on the building interior spaces. Although it can be done with operable windows for perimeter spaces, energy is only one consideration. Other considerations include temperature comfort levels in the summer, wind, street noises, infiltration of unfiltered air (as it affects house cleaning) and investment costs.

"The use of operable windows in lieu of mechanical ventilation and cooling would obviously reduce energy consumption. Such reductions would be partially offset, however, by additional heating energy requirements to overcome infiltration of cold air through window cracks.

"B. Alternate Mechanical Systems: A variable air volume system is planned for this project. This system is more energy conserving than other systems that might be considered. Such other systems include reheat, multi-zone, double-duct, air-water induction, fan-coil, package units, electro-hydrionic and through-the-wall.

"The planned air system will incorporate an economizer cycle to optimize the percentage of outside air and employ, to the extent possible, free cooling with 100% outside air, with the chillers off.

"C. Double-Glazing: The building temperatures are maintained in the range of 68° - 78°F. The average outdoor temperature is approximately 55°F. The outdoor temperature is in the range of 50° - 75°F approximately 79% of the time. During these hours there is either (1) no heat conduction through the windows, or (2) heat transfer from the building to the out-of-doors. This heat transfer is constructive since it naturally removes from the building the heat generated by lighting, machines, and people.

"The value of double-glazing in the San Francisco climate is quite doubtful for major office structures.

"D. Solar Energy: In this comparatively mild climate, passive solar energy (i.e., solar radiation through windows) already provides a significant amount of the building space heating requirements. Use of active solar energy collectors requires much more area than is available on the roof of the building, and the west and north faces of the building are functionally inappropriate."

INSERT HERE STARTING WITH PAGE 103A.

1. Carl Jordan, mechanical engineer, Skidmore, Owings & Merrill, Architects-Engineers, memorandum dated December 23, 1976 and personal communication.

As discussed on page 87, preliminary designs for the mechanical and electrical systems of this proposed building were completed in June, 1977, allowing update of energy consumption information in the draft EIR that had been based on only general planning factors. A number of specific design provisions that significantly reduce potential energy demand have been incorporated in the preliminary design, in addition to the use of a variable air volume system with economizer cycle as identified above for the proposed building. These additional items are described on page 87 of the Final EIR, and include reduced light levels, local switching control, use of heat from lighting, and use of local heating units.

A major change in mechanical design was the decision to use district steam from the PG&E power plant for heating rather than an oil fired boiler in the building. District steam now serves several office buildings in the area. It is advantageous because of the increased efficiency of energy utilization resulting from the scale and character of the PG&E plant, whose primary function is generation of electrical power. A second advantage is the flexibility presented by a large centralized unit such as the PG&E plant, compared to a small oil-fired unit installed in an individual building, to respond to changes in fuel cost and availability. For example, it may be found feasible in the future to convert the district steam generation system to use fuel derived from recovered solid wastes, an action that would be impractical for an individual office building boiler. At present, the PG&E unit can use either natural gas or oil as fuel.

There are design modifications that would further reduce the energy consumption. These are not being considered at this time by the developer

because he believes the substantial added cost in relation to saving would be prohibitive and would jeopardize the ability to build this structure.

If the air quantity passed through the system were doubled by installing full size air handlers on every floor rather than every other floor and doubling the size of the supply air ductwork and air outlets, the cooling system would go off the line completely when the outdoor temperature drops to 60° instead of 52°. This would produce a substantial savings in energy consumption. However, beside losing 6000 sq. ft. of rentable space, the investment is increased by approximately \$1,500,000. It is feasible to do this in the future should energy costs increase to such an extent as to make this economically possible.

It is also possible to install large insulated storage tanks, one for chilled water and one for hot water. This would not reduce the total amount of energy used but would shade the peak loads by operating during night hours. Some dollar savings would be accomplished by a lower demand charge.



## VI. ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED IF THE PROPOSAL IS IMPLEMENTED

Implementation of this proposed office building would result in adverse impacts on traffic and people due to construction activity, and in general increased congestion and demand for services in the downtown area after the building is occupied. Adverse impacts that cannot be further mitigated include the items below.

The project would result in an increased use of private automobiles in the downtown and region, with attendant congestion and air pollutant emissions impacts. The number of pedestrians in the finance and administrative district and downtown would also be increased. The curb lane of the street on both sides of the site would be lost to traffic use and pedestrian movement relocated to a temporary sidewalk during construction.

Demand on public transit would increase, as would demand for other public services such as police, fire protection, and utilities. While this increment of additional loading would not exceed the existing capabilities of any service element other than transit, the continued growth in downtown office related uses has required an expansion of service capacities (e.g., new sewage treatment facilities, acquisition of new Muni vehicles).

The existing low-rise buildings on the site would be demolished, including the E.F. Hutton Building. The proposed building would be a 26 to 29-story high-rise office tower of different design character. Buildings near the site are also largely high-rise. Sunlight reaching the street would be reduced and wind forces increased.

The proposed office building would consume nonrenewable material and energy resources in construction and in operation.



## VII. ALTERNATIVES TO THE PROPOSED ACTION

### A. SITE ALTERNATIVES

The developer seeks a location in the core of the finance and administrative district in order to offer building tenants the maximum advantages of proximity and visual exposure to other offices and elements of the district. A site search was conducted by Grubb and Ellis which resulted in identification of the proposed site.

Office building development serving central financial/administrative functions in the City of San Francisco is occurring primarily in the finance and administrative district, with secondary activity in proximate areas. Although individual tenant needs vary, the greatest demand for and value of office space is within the core of the finance and administrative district, comprising the area bounded by Kearny Street to the west, the Embarcadero to the east, Washington Street to the north, and Market Street to the south. Demand is highest for office space in the Montgomery corridor within this area.

Of the 47 blocks of property bounded by public streets in that area, Grubb and Ellis report that 31 are not suitable for consideration for development in the near future because of age of existing structures, investment commitment, tenant commitment, and other similar constraints. Few of the remainder were of size and configuration to result in a cost efficient building.<sup>1</sup>

- 
1. An office building is designed to minimize gross area and construction cost, and maximize rental area. Important considerations include appropriateness (to the tenant market) of the size and dimensions of a rental space on a floor, and the avoidance of floor and building configurations that are expensive to build and difficult to divide up into rental office space efficiently. Site size, configuration, access, and zoning are all critical determinants.

Further consideration of site price and the attractiveness of location to a tenant market narrowed the selection to the proposed site.

Although office buildings are being built outside the core finance and administrative district defined above, the areas south of Market and in the Yerba Buena Center are considered by the project sponsor to be peripheral to the area of maximum business activity, prestige, and related demand for office space. Office building development in those areas is usually undertaken on the basis of the commitment of occupancy by a large corporation, either on an ownership or lease basis, which finds the conditions of setting and cost to be acceptable to its needs. Corwin Booth and Michael T. Hall propose to develop a building to meet the demand by smaller, professional firms for office space in the core area.

Other sites outside the core finance and administrative district, in San Francisco and elsewhere in the Bay Area, are available for office building construction but do not offer the market characteristics which are the objective of the developer: a highly concentrated demand for high-rental office space by small firms.

The construction of an office building south of Market would have less impact on pedestrian and vehicular congestion than a similar sized building in the finance and administrative district because of the lower density of development that exists there. However, an increased proportion of occupants might use private automobiles because of proximity to cheaper parking, with consequently increased regional transportation system and air quality impacts.

#### B. USE ALTERNATIVES

The use zoning of the proposed site, C-3-0, allows office and retail commercial land uses. Limited retail commercial would be included in the proposed project. The developer, based on personal knowledge of the retail space market in the area, indicates he finds demand does not exist to financially support increased space in this function in his proposal.

The Residence Element of the San Francisco Comprehensive Plan, as revised and adopted in public hearing December 11, 1975, by the Planning Commission, states as Policy 2 of Objective 2:

"Encourage the conversion of under-utilized non-residential land to residential use, and encourage new residential development in the downtown area... The City should encourage multiple residential development in conjunction with commercial use in the downtown commercial area."

An anticipated principal benefit of such residential development would be the reduction of traffic generated by downtown activity and employment, and the stimulus to 24-hour activity in an area now dominated by work day office employees.

However, residential units generate approximately one-third of the rent per square foot that proposed office uses do, which seriously constrains investment. The developer believes this is not an acceptable economic return on investment in this real estate.

The present zoning codes would require a Conditional Use authorization by the City Planning Commission for dwelling units within a C-3-O district. In addition, provision of parking in the project would be necessary for marketing attractiveness.

The site could also be used as a public urban park. The closest such park to the site at present is Crocker Plaza, two blocks south on Market Street at Montgomery. Such spaces are extremely popular in densely crowded areas such as the finance and administrative district. Use tends to be heavy during the lunch period, but light during the remainder of the work day. This particular site experiences extensive periods of shadow, being on the north and west sides of two tall office buildings. It is also exposed to the winds generated by those buildings. At present, the site would have to be purchased on the open market at a price determined by maximum office

development potential, and demolition of part or all of the existing structures would be necessary. Existing and potential tax revenues would also be lost.

#### C. DESIGN ALTERNATIVES

The project as proposed utilizes roughly all the area allowed by city code. The boundaries of the tower are as defined by code property lines and an air rights easement. The typical floor area dimensions could not be reduced without decreasing the potential individual office unit area and its dimension below that believed by the developer to be responsive to market demand.

Areas which would not be enclosed are the proposed arcade around the building, a proposed plaza area under the air rights easement (which extends down to the level of the roof of the existing Title Insurance Building) and the proposed plaza area behind the French Bank Building (see Figure 3, page 8). These open space uses are proposed by the developer in the expectation of receiving 39,015 square feet of "bonus" building area allowance under the provisions of the City Planning and Building Code. City approval of this bonus is uncertain due to microclimate and configuration constraints on its public use.

If the office tower were reconfigured to incorporate the small rectangle of site behind the French Bank, possibly as an off-set service core, an increase in construction unit cost would result. The proposed tower is now a simple rectangle and the added element would result in an "L" shape. The developer states that introduction of an irregular shape would increase construction unit costs 20 to 25% in comparison to a basic rectangle. In addition, an off-set core would decrease floor utilization efficiency for small tenants, the developer's proposed market.

Design alternatives for the proposed plaza are discussed on page 99 as mitigating measures. However, it is physically possible to shift the ground floor location of retail spaces and open spaces to allow increased open space along Montgomery and Bush streets under the tower. This would improve light, wind protection, and access conditions, but at possibly increased construction cost and decreased retail marketability for the developer. Such a shift may not qualify for the amount of bonus allowance anticipated by the developer from his proposed design; it may also have negative economic ramifications for the development.

A shorter building (of the same typical floor area but with fewer office floors) than proposed would tend to reduce impacts such as transportation, related air quality, land use/economic, public services, and energy on an approximately proportional basis. It would also increase unit costs of the proposed project and reduce the total revenues generated for a net decrease in rate of economic return for the developer.

The City Planning Department has indicated it may be visually desirable to build to the maximum height permitted by the zoning, thereby doing as much as possible to create the visual aspect of a "hill" of office buildings in the downtown area as discussed on page 59. A 500-ft. high building of the same total area as now allowed by the zoning (more floors but with less area on each typical floor) would not reduce the service core requirement on a typical floor (the core may increase to accommodate an additional elevator), but the floor would lose rental office area. The result would be a net reduction in rental office space and revenue of roughly 20% without any

change to the gross space of the building or its construction cost (construction cost may actually increase). In addition, the individual office dimensions and area would be reduced below what the developer believes is responsive to market demand.

Occupancy and impacts related directly to occupancy (transportation, related air quality, economic, public services, etc.) would tend to be reduced proportionate to the decrease in rentable floor area, 20%. Wind forces at street level would tend to be increased roughly proportional to the increase in height (22%). Energy consumption would increase somewhat for the higher lifts involved, but the increased skin area is not expected by the design engineers to materially affect fuel consumption (because of San Francisco's temperate climate).

Preservation of the facade of the E.F. Hutton Building in the new building, in order that the imagery and psychological response to the familiar neoclassic building would be preserved, is possible but would require extensive reconstruction (removal and replacement). This would be costly, and opportunities for either widening the sidewalks or having a sidewalk arcade would be lost. In addition, the scale and imagery of the old facade could be affected by incorporation into a 29-story building.

#### D. NO-PROJECT ALTERNATIVES

If the proposed project were not undertaken, the property would remain on the market for use in another project. Market demand for new office space in this area is such that it cannot be expected that the site would remain with the present buildings and uses for any extended period without formal City intervention and constraint. Further, it can be expected that the increment of office space demand that this project is intended to satisfy would be responded to by another building proposal in the same general area if this project were not implemented.

A future project would tend to develop to the maximum allowed by code, as does this project, and for similar occupancies. Impacts resulting from such future development would be similar to those of the proposed project, except to the extent that the delay may result in changes in construction cost, zoning, energy conservation capabilities, or other factors that affect impacts. Thus, the net impact resulting from "no project" would be a delay in occurrence of development and of the impacts resulting from development.

If no action were taken and the present structures did remain for an extended period of time, the City would require investigation of and strengthening or removal of the parapets, cornices, and related projections on the buildings to bring them into conformity with the parapet code (see page 36). If these decorative elements were removed, this could result in loss of some of the neoclassic character of the E.F. Hutton Building. The structure of the existing building is not designed in accordance with the current code requirements for earthquakes and extensive strengthening of the building would be necessary to bring it up to code if any major renovation were attempted. Even if this were done, the resistive capacity of the building would be only one-tenth of that recommended by Geotechnical Consultants to the developer's consulting engineers.<sup>1</sup>

The three buildings are unoccupied, but it is expected that new tenants would be found, particularly if the facilities were remodeled. The number of occupants of the three structures would be approximately 410 or roughly

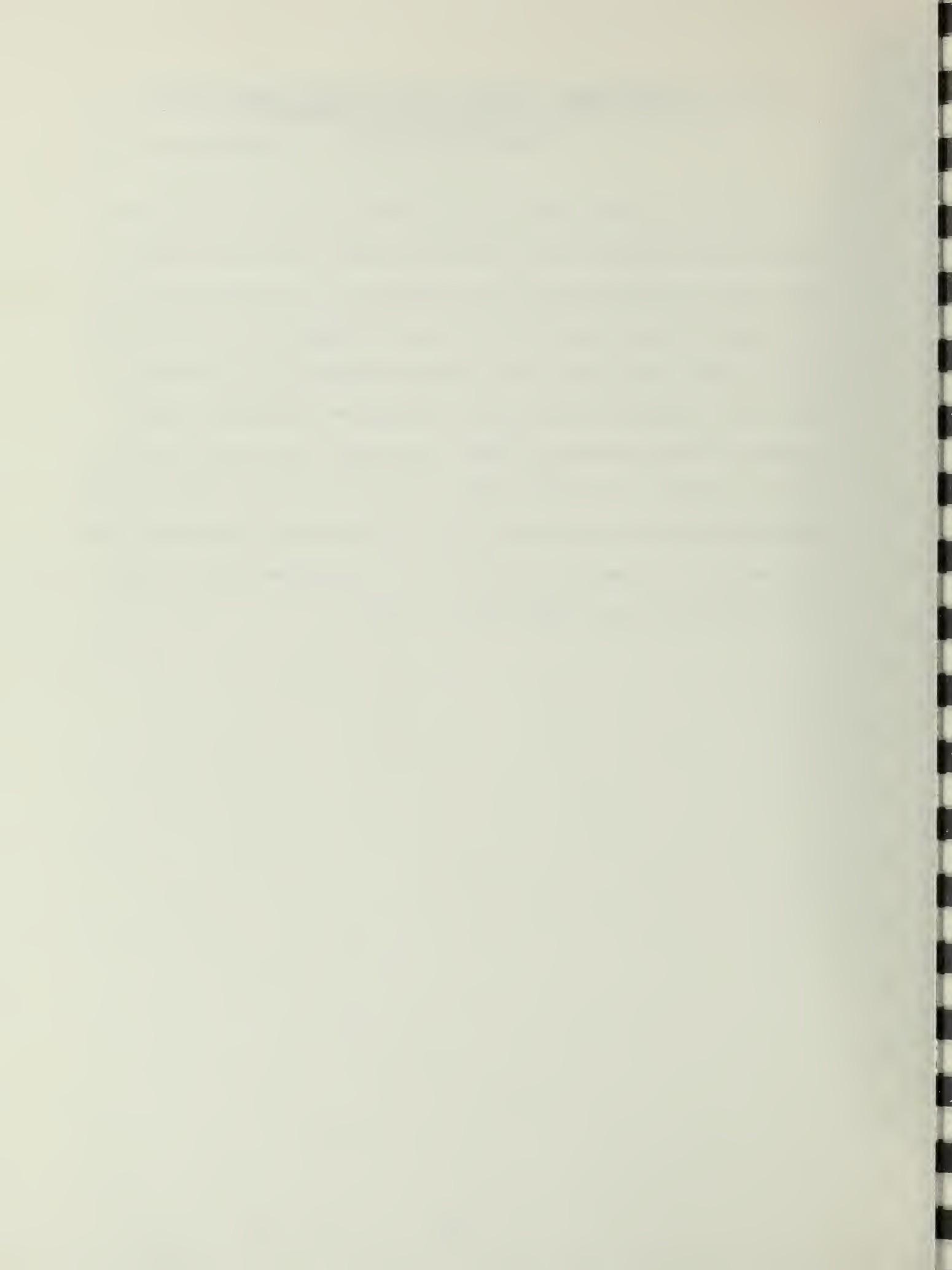
---

1. Ruthroff & Englekirk Consulting Structural Engineers, Inc.,  
Letter of June 11, 1976, to Gerald D. Hines Interests.

17% of the occupancy of the proposed project. Effects on transportation and circulation would be proportionately less.

## VIII. THE RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

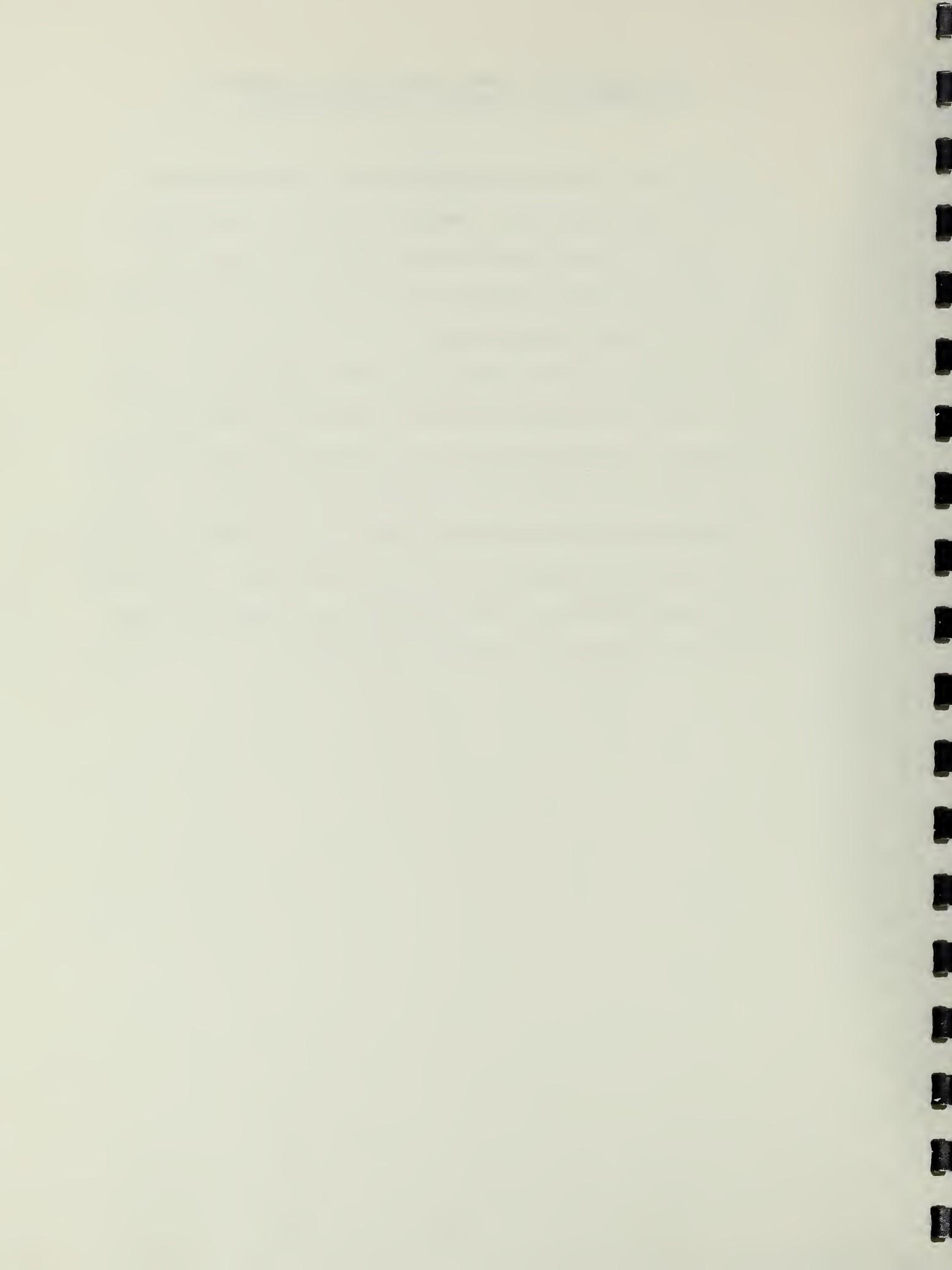
The project would commit the site to the proposed uses for at least several decades and thus limit its use for other purposes which might in the future be deemed desirable. The location of the proposed site is in an already developed area where commercial buildings make up the majority of land uses. The zoning of this area for high-rise development and, in turn, the assessment of the land for this type of development leave no reason to believe that there would be any change in land uses in the next several decades. It is likely that the use of the proposed site for high-rise development would eventually occur if this proposed project were not implemented. The immediate construction of the proposed building would ease the present tight supply of office space.



IX. ANY IRREVERSIBLE CHANGES WHICH WOULD BE INVOLVED IN  
THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

Construction of the proposed building would expend unrenewable material and energy resources. Subsequent operation of the building would continue to expend these resources. The construction of the proposed building on the site would commit the site to this particular building for at least several decades.

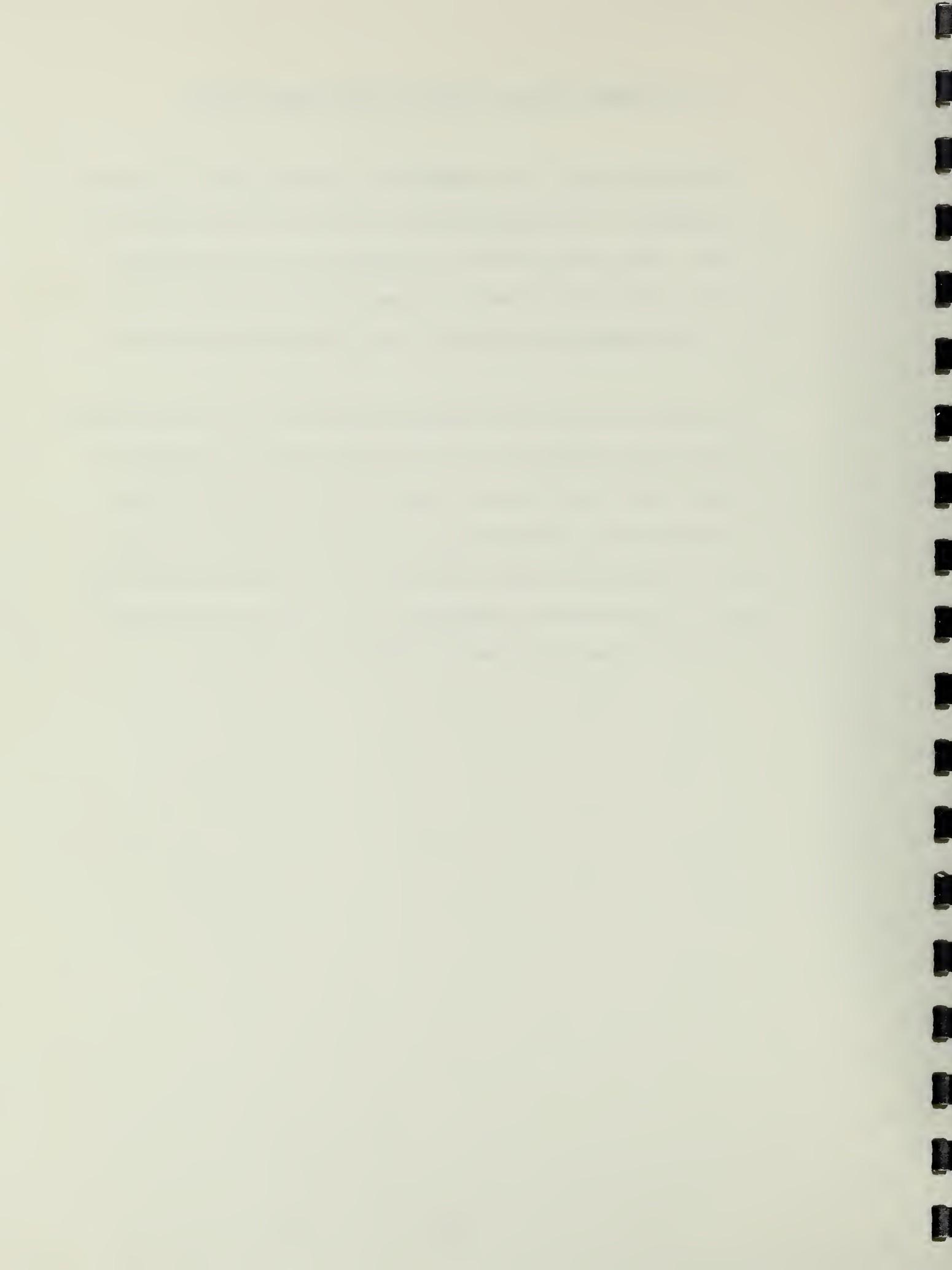
The site is in an active seismic area with a potential for liquefaction. Even if a building is designed to minimize the impetus of an earthquake, a possibility exists that the building would be affected in such a manner that there would be falling objects, glass, etc., from the building which could harm persons near it. In this sense the proposed building could pose a long-term risk to health and safety. The proposed building replaces existing structures having facade elements the City has declared to be potential hazards in an earthquake.



## X. THE GROWTH-INDUCING IMPACT OF THE PROPOSED ACTION

The proposed project is one element of a general pattern of high-rise office development in the downtown area, a trend that has been under way for 20 years. This growth has been in response to increased demand for office space located in the finance and administrative district of San Francisco. This demand exists whether or not this proposed project is built.

The tenants of the proposed building would probably be mostly existing firms which relocate from other buildings (with or without expanding in the process) rather than firms new to the area, but the effect for the area would tend to be an equivalent net increase of jobs and employees. Economic activity and employment, and demand for services and housing in San Francisco and surrounding communities, would tend to expand by this amount plus that stimulated in associated service categories.



## XI. ENVIRONMENTAL IMPACT REPORT AUTHORS AND PERSONS CONTACTED

### EIR AUTHORS

San Francisco Department of City Planning  
100 Larkin Street  
San Francisco, CA 94102  
Coordinator: Ralph Gigliello  
Environmental Review Officer: Dr. Selina Bendix

Arthur D. Little, Inc.  
One Maritime Plaza  
San Francisco, CA 94111  
Coordinators: Donald P. Black, Larry R. Aull

Environmental Impact Planning Corp.  
Microclimatic Evaluation  
319 Eleventh Street  
San Francisco, CA 94103  
Coordinator: Donald Ballanti

Skidmore, Owings & Merrill  
Architects-Engineers  
Project Architects  
One Maritime Plaza  
San Francisco, CA 94111  
Walter Costa, Partner

### DEVELOPER

Corwin Booth and Michael T. Hall  
610 Newport Center Drive  
Newport Beach, CA 92660  
Coordinator: Michael T. Hall

### PERSONS CONTACTED

<u>Organization</u>	<u>Person</u>
Alameda - Contra Costa Transit District	Don Larsen Senior Planning Coordinator
Bay Area Air Pollution Control District	Paul Brand Information Officer Helene Kornblatt
Bay Area Rapid Transit District	Bill Hein Director of Planning Ward Belding Economic Analyst
The Foundation for San Francisco's Architectural Heritage	Robert Berner Urban Conservation Officer

Organization

Golden Gate Bridge, Highway, and Transportation District

Golden Gate Disposal Corp.

Metropolitan Parking Corp.

City of Mountain View  
Engineering Department

Ruthroff & Englekirk Consulting  
Structural Engineers, Inc.

San Francisco Department of City Planning  
Environmental Review Section  
Transportation Planning Section

San Francisco Department of Public Health

San Francisco Department of Public Works  
Bureau of Engineering

San Francisco Department of Public Works  
Bureau of Sanitary Engineering

San Francisco Department of Public Works  
Bureau of Traffic Engineering

San Francisco Fire Department  
Division of Planning and Research

San Francisco Landmarks Advisory Board

San Francisco Police Department  
Division of Planning and Research

San Francisco Public Utilities Commission

Tentau & Associates, Realtors

Person

Jerome M. Kuykendall  
Assistant to General Manager  
for Planning and Research

John Ferrando  
District Supervisor

Robert Baker  
Assistant Secretary

Richard Haughey  
Assistant City Engineer

Robert E. Englekirk  
Vice President

Alec Bash  
Planner  
Ed Green  
Planner

Robert MacDonough

Cormic Brady  
Mechanical Engineer

Lou Vagadori  
Mervin Francies, Engineer  
Robert Cockburn

Peter Woo  
Assistant Traffic Engineer

Robert E. Rose  
Chief

Ed Michael,  
Secretary

Robert Bernardini

James J. Finn  
Director of Transportation

Hart Tentau  
Frank Harlan

## XII. DISTRIBUTION LIST

### A. REGIONAL AGENCIES

Association of Bay Area Governments  
Hotel Claremont  
Berkeley, California 94705

Bay Area Air Pollution Control District  
939 Ellis Street  
San Francisco, California 94109

Metropolitan Transportation Commission  
Hotel Claremont  
Berkeley, California 94705

Bay Area Rapid Transit District  
800 Madison Street  
Oakland, California 94607

Golden Gate Bridge Highway and Transportation District  
P. O. Box 9000, Presidio Station  
San Francisco, California 94129

### B. LOCAL AGENCIES

Public Utilities Commission  
James J. Finn, Director of Transportation  
949 Presidio Avenue  
San Francisco, California 94115

Mr. Roger Boas  
Chief Administrative Officer  
289 City Hall  
San Francisco, California 94102

San Francisco Fire Department  
Rene Gautier, Chief  
260 Golden Gate Avenue  
San Francisco, California 94102

San Francisco Police Department  
Director of Traffic  
850 Bryant Street  
San Francisco, California 94103

Human Rights Commission  
1095 Market Street, Room 501  
San Francisco, California 94103

Commission for Utility Liaison for  
Construction & Other Projects (CULCOP)  
% GES - Utility Liaison  
City Hall - Room 363  
San Francisco, California 94102  
Attention: Herman Beneke

C. GROUPS AND INDIVIDUALS

San Francisco Planning and Urban Renewal Association  
John H. Jacobs, Executive Director  
126 Post Street  
San Francisco, California 94108

Chamber of Commerce  
400 Montgomery Street  
San Francisco, California

San Francisco Tomorrow  
728 Montgomery Street  
San Francisco, California 94111  
Attention: Ms. Sue Hestor

San Francisco Beautiful  
840 Urbano Drive  
San Francisco, California 94127  
Attention: Mr. Henry Heyl

Northern California Committee for Environmental Information  
P. O. Box 761  
Berkeley, California 94701  
Attention: Mr. Donald Dahlsten

Women in Construction  
% Prim Investments  
650 California Street - Suite 2900  
San Francisco, California 94102

Bay Area Women's Coalition  
944 Market Street  
San Francisco, California 94102

National Trust for Historic Preservation  
801 Montgomery  
San Francisco, California 94133

Hart H. Tantau  
111 Sutter  
San Francisco, California 94104

Heritage  
2007 Franklin  
San Francisco, California 94109

Ecology Center of San Francisco  
Attention: Mr. Mark Kasky  
13 Columbus Avenue  
San Francisco, California 94111

Friends of the Earth  
529 Commercial Street  
San Francisco, California 94111  
Attention: Ms. Connie Parrish

Sierra Club  
San Francisco Bay Chapter  
5608 College Avenue  
Oakland, California 94618

San Francisco Maritime Museum  
Foot of Polk Street  
San Francisco, California 94109  
Attention: Mr. Harlan Soeten, Curator

Downtown Association  
582 Market Street  
San Francisco, California 94104

Junior World Trade Association  
465 California Street  
San Francisco, California 94104

Dennis L. Kent  
3206 Harrison  
San Francisco, California 94110

John Blackman  
40 Fifth Avenue  
San Francisco, California 94118

#### D. MEDIA

San Francisco Chronicle  
Dale Champion  
925 Mission Street  
San Francisco, California 94103

San Francisco Bay Guardian  
1070 Bryant Street  
San Francisco, California 94103

San Francisco Examiner  
Don Canter  
110 Fifth Street  
San Francisco, California 94103

The Sun Reporter  
1366 Turk Street  
San Francisco, California 94115

San Francisco Progress  
Dan Borsuk  
851 Howard Street  
San Francisco, California 94103

#### E. LIBRARIES

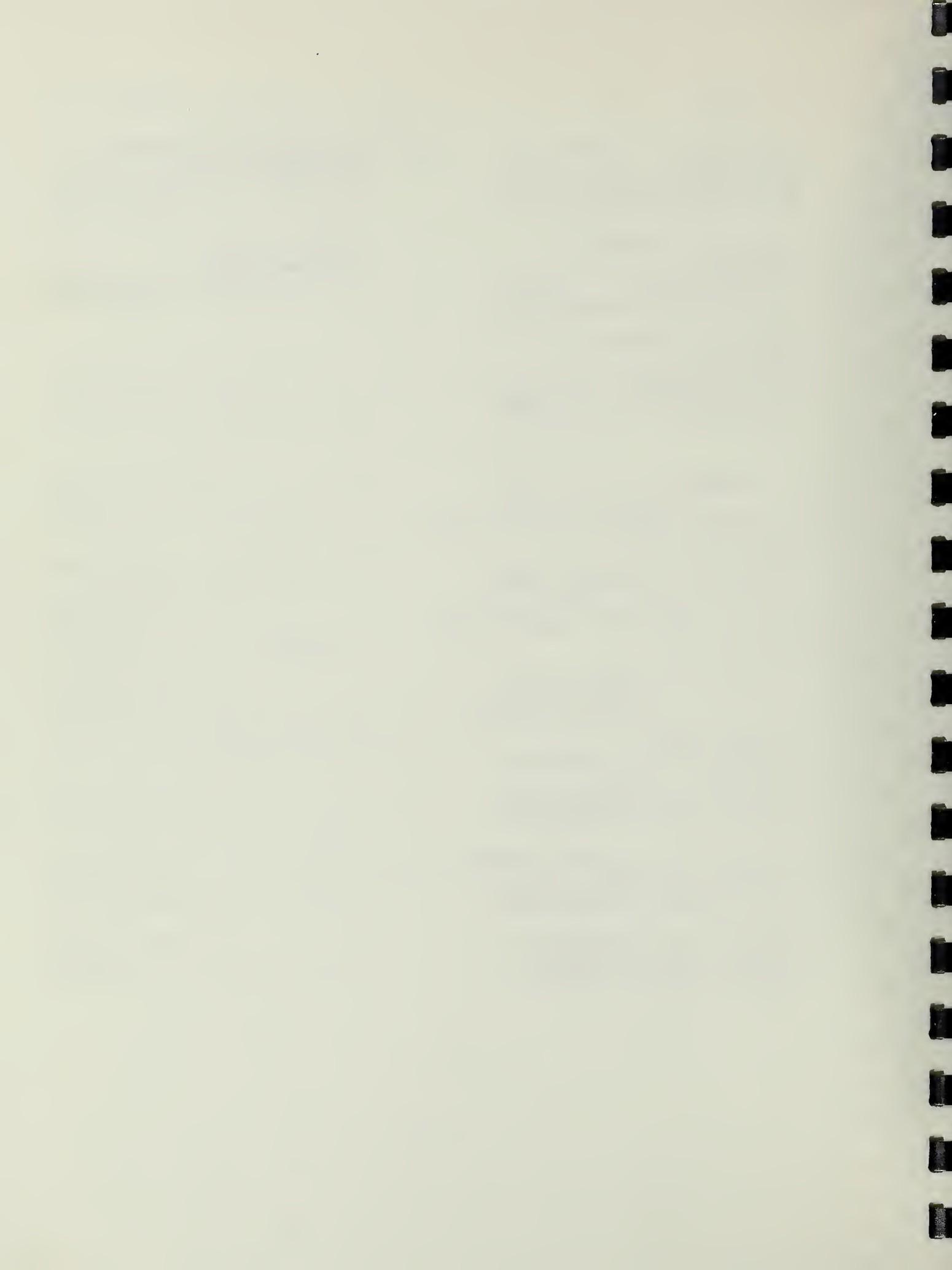
San Francisco Public Library (3 copies)  
Documents Department  
Civic Center  
San Francisco, California 94102

Environmental Protection Agency Library  
Jean Ciriello  
100 California Street  
San Francisco, California 94111

Social Science, Business and Ethnic  
Studies Library  
San Francisco State University  
1600 Holloway Avenue  
San Francisco, California 94132  
Attention: Ms. Mimi Sayer

Hastings College of the Law Library  
198 McAllister Street  
San Francisco, California 94102

Government Documents Section  
Stanford University Library  
Stanford, California 93063



## XIII. COMMENTS AND RESPONSES

ERRATA: Staff noted at the public hearing of May 12, the following errata:

A bridge between the 19th floor of the proposed building and the Standard Oil building adjacent would require a conditional use permit. Page 1 and 9 of the text of the EIR have been revised to reflect this requirement (see pages 1 and 9 of Attachment A.)

COMMENT #1: Verbal comment delivered at public hearing May 12, 1977, by Ina Dearman, San Francisco Planning Commissioner: "Can you explain to me how the (size of the plaza and whether it) gets any sun affects how large you can build the building?"

RESPONSE #1: The City Planning Code (section 122 of Part II of Chapter II of the Municipal Code) states that provision by a developer of a plaza area meeting defined criteria, and useable for sitting and similar pursuits by the public, entitles the developer to construct defined amounts of building space on the property as a "bonus" in addition to that otherwise permitted. The purpose of such bonuses is to encourage private projects to provide public amenities that support the vitality and pleasantness of the downtown area. The characteristics of the public space initially proposed by the developer did meet dimensional constraints but did not appear to staff to meet the intent of the code. The developer has therefore modified his design, as described in the revised pages 1, 5, 5A, 8A, 8B, 14A, 14B and 19) of the EIR text (see pages 1, 5, 5A, 8A, 8B, 14A, 14B and 19 of Attachment A). The Zoning Administrator will not make a definitive ruling on the acceptability of this design until the formal site plan approval application is processed, after this EIR is completed. The EIR as written addresses the possibility of a

project reduced in building size if the "bonus" area, equivalent to approximately three floors of the building, is not approved for the plaza.

COMMENT #2: Verbal comment delivered at public hearing May 12, 1977, by Sue Bierman, San Francisco Planning Commissioner: "I would like to know what the increase (in wind force at the base of the proposed building) is,...a comparison made...and the mitigation..."

RESPONSE #2: New buildings represent obstacles to the airflow, resulting in a shift of wind patterns at street level. There are normally some areas where winds are accelerated, and some areas (normally downwind of the building) where winds are decreased.

For west and northwest winds (most frequent in San Francisco) winds both increase and decrease around the base of the proposed building. On a typical windy day (25 miles per hour at the San Francisco Weather Bureau Station) the highest winds near the building would increase from 12 to 13 miles per hour. Decreases would occur along Montgomery Street; the greatest decrease would be from 11 to 8 miles per hour on a typical day. These winds are moderate when compared to those near other buildings studied in San Francisco. For example, winds at Grosvenor Plaza, a well known windy area, would exceed 27 miles per hour under the same wind direction and speed conditions.

Mitigation measures to improve wind conditions are discussed on pages 101-102 of the Draft EIR.

COMMENT #3: Verbal comment delivered at public hearing May 12, 1977, by Sue Bierman, San Francisco Planning Commissioner: "I would like to see them compare the earthquake damage between (the proposed building) and the low E. F. Hutton Building. I just think (the damage of the existing building on the site is) overdrawn compared to what they are going to put up."

RESPONSE #3: Ruthroff and Englekirk, Consulting Structural Engineers,<sup>1</sup> have advised the developer that extensive strengthening of the existing buildings on the proposed site would be required to meet minimum lateral force requirements of the San Francisco Building and Safety Code. They further state that such strengthening would result in a "resisting capacity...only one-tenth of that required by current building codes or standards recommended by geo-technical consultants..." In addition, the Department of Public Works has required the strengthening or removal of certain apendages to the facade of these existing buildings as they represent potential hazard to pedestrians.

The proposed building would conform to existing code requirements for resisting strength and apendages. However, it is pertinent to note that the proposed building would have perhaps 29 stories of window glass and other exterior wall materials that would be subject to breakage, resulting in a large quantity of material falling from great height into pedestrian areas in event of an earthquake. The quantity of falling material, particularly glass fragments, to which pedestrians are exposed may be much greater for the proposed project than the existing buildings because of their relative size and relative proportions of glass. Broken glass, falling ceiling panels, etc. would also be a hazard to occupants inside the proposed building.

COMMENT #4: Verbal comment delivered at public hearing May 12, 1977 by Sue Bierman, San Francisco Planning Commissioner: "...the EIR said... that all the Landmarks Board cares about is that the plaque that is on the building commemorating its having been something else previous to the building -- that the little plaque be placed on the new building.

---

1. Letter of June 11, 1977 to Gerald D. Hines Interests, from Robert E. Englekirk, Ruthroff & Englekirk Consulting Structural Engineers Inc. (California Licensed Structural Engineer #1461).

And I wondered if that was the current Landmarks Board's feeling. Will you be looking at the building at all?"

RESPONSE #4: Verbal response delivered at public hearing May 12, 1977, in reply to Comment #4, by Mrs. G. Bland Platt, President, Landmarks Advisory Board: "I haven't seen the EIR so I don't know quite what it says. There is a plaque on the building and it is considered to be important and I am sure there was discussion with regard to replacing it. If it is not put in the EIR, somebody goes away with it and it never gets replaced. I think the sentiment of the Board is that if such and such new building is going to be built, then we are not going to consider the building. I am concerned about the consequences on the Mills Building, which is a landmark."

COMMENT #5: Verbal comment delivered at public hearing May 12, 1977, by Ina Dearman, San Francisco Planning Commissioner: "...the French Bank building should not be overwhelmed by an unsympathetic neighbor. It seems to me if I'm only 10 stories tall next to 31, I'm overwhelmed...why put it in here. Is there some way that this Commission could get a plaza and a lower building on it?"

RESPONSE #5: The relationship of the proposed project to the existing French Bank and Mills Building is a reason that the design should be done sensitively. Staff of the Department of City Planning felt that the initial design might not be sensitive enough and is continuing to discuss modifications with the developer. The EIR provides basic information concerning the characteristics and height of the proposed project. The question is not of the adequacy and certification of the EIR, but whether the Commission finds particular problems with the proposed building; if the Commission finds the standard code provisions are not adequate when applied to this project, the Commission can

exercise its powers of discretionary review. There is no established policy of discretionary review affecting this site. The building is lower than the height limit of 500 feet. There are other design considerations which call for a building up to that height limit, as noted in the EIR. A taller building particularly would contribute to the urban hill form envisioned for the downtown in the Urban Design Plan. The height limits in downtown were set in accordance with this intent, encouraging buildings to be constructed to that height. The separate question whether the developer should be allowed bonus square footage for the proposed plaza is an action for which the zoning administrator is responsible. See page 12 of the EIR for further discussion.

COMMENT #6: Verbal comment delivered at public hearing May 12, 1977, by Sue Bierman, San Francisco Planning Commissioner: "Maybe there are some real problems with the (Urban) Design Plan. There is no room for people in garages, no room for cars to park, there is no room for the people on the transit system, there's no room for the people on the sidewalks...you think of people who are going home at 6:00....and a lot of them are going to have to stand because we are going to allow a lot of these high buildings to go through....then I wonder if this size building ought to be built."

RESPONSE #6: The principal issue raised, relative to continued office development in the downtown area is very long range and is being addressed to some extent by the Commerce and Industry Study in the City Planning Department but can also be discussed on an ad hoc basis by the Commission. However, it is beyond the scope of this EIR.

Transportation and sidewalk circulation conditions that could be experienced in the downtown area when the proposed building is occupied are described on pages 70-72 (Public Transit), pages 73-74 (Traffic), page 75 (Parking) and pages 77-79 (Pedestrian Impact) of the Draft EIR.

All were noted as the equivalent of heavy flow, but below maximum capacity. Some public transit lines as now scheduled are presently at full capacity, but the system as a whole has capacity to accommodate additional loadings; MUNI planning staff normally review use and make service changes to meet demand as it develops.

Impacts estimated in the Draft EIR are "worst case", based upon a building population assumed similar to that of conventional office buildings. The developer asserts his proposed building is oriented to smaller professional firms that will occupy more area per person than is conventional, resulting in a building population 50% of the "worst case" population used. The implications for transportation demand of varying building populations are seen in Table 8 of the Draft EIR as revised to show both population bases (see page 69 of Attachment B).

COMMENT #7: Verbal comment delivered at public hearing May 12, 1977 by Toby Rosenblatt, San Francisco Planning Commissioner: Why is the automobile/transit modal split used in the EIR 53/42% when..."my recollection is that projected modal split based on the samples contained in the SPUR highrise study summary was on the order of 70% transit?"

RESPONSE #7: Staff of the Department of City Planning, particularly Ed Green, Transportation Planner, feel that the SPUR study was not entirely correct in some of its assumptions and in selection of its sample. The modal split used in the EIR was provided by Mr. Green, drawn from data he believes more representative of this office building. Indeed, Mr. Green believes and the EIR notes that this modal split may still under-estimate the proportion of employees using automobiles, if the developer's expectations of occupants are correct; automobile use tends to increase and public transit use decrease as the income level of building occupants increase (a low density professional office building will tend to have higher income level

occupants than the conventional office building). No data is available at present to quantify this increase. However, the number of building occupants would thereby be fewer than estimated in the "worst case" presentation of the EIR, probably resulting in roughly the predicted number of auto trips but far fewer transit trips.

COMMENT #8: Verbal comment delivered at public hearing May 12, 1977 by Toby Rosenblatt, San Francisco Planning Commissioner: "Does the building as it is proposed to be designed in its latest phases conform with the proposed Title 24 regulations?"

RESPONSE #8: The heating, cooling, ventilating and lighting systems have been designed to be within the criteria of the presently proposed energy limitations of California Administrative Code Title 24.

COMMENT #9: Verbal comment delivered at public hearing May 12, 1977, by Charles Starbuck, San Francisco Planning Commissioner: "Table 8 on page 69 (of the Draft EIR) talks about 1241 auto trips. Page 2 (of the Draft EIR Summary) talks about 955 vehicle roundtrips."

RESPONSE #9: The number on page 2 of the Draft EIR summary is in error, the correct number of 1241 estimated automobile roundtrips is as given in Table 8 on page 69 of the EIR. The number on page 2 has been changed in the Final EIR from 955 to 1241.

COMMENT #10: Verbal comment delivered at public hearing May 12, 1977, by Charles Starbuck, San Francisco Planning Commissioner: "I have this big concern about the SPUR study. It is somewhat dated. I believe it was finished in December 1975 and things have changed within the demographics of the work force considerably since that time. I'd be astounded if by 1980 we still had such a modal split."

RESPONSE #10: See RESPONSE #7.

COMMENT #11: Verbal comment delivered at public hearing May 12, 1977, by Charles Starbuck, San Francisco Planning Commissioner: "...the section on energy use mitigation measures on page 103 is too weak...can't tell which of the alternate mechanical systems are in fact the ones that are going to be used until you read it with a magnifying glass....There is nothing said about dramatically increasing utility rates so there is no way to compare these systems both in terms of investment costs and long-range energy consumption in terms of price."

RESPONSE #11: Water and energy demands of this project as presented in the Draft EIR, were based on general planning data available at the time of preparation. Design has continued and preliminary system and equipment information is now available that allows more specific and accurate estimates of energy and water demand to be made. The EIR has been revised to reflect this new information (see Attachment C). Estimated water consumption has increased from a range of 35,000 - 47,000 gallons per day in the Draft EIR to a range of 40,000 - 64,000 gallons per day based on June 1977 design data. Estimated electrical energy consumption, conversely, has decreased from 620,000 KWH per month in the Draft EIR to 448,000 KWH based on June 1977 design data. Estimated energy consumption for heating was reduced from 123 to roughly 110 BTU/sq.ft./day (including a conservative 20% PG&E oil-to-steam conversion factor). This resulted in part from the more specific information available from the project design engineers, but also from incorporation of added measures specifically to reduce energy demand.

COMMENT #12: Written comment in the form of a letter from John H. McKoy, Director of Planning and Programming, Association of Bay Area Governments, to Ms. Selina Bendix, Department of City Planning, City of San Francisco, dated May 4, 1977, read at Public Hearing May 12, 1977:



# Association of Bay Area Governments

Hotel Claremont • Berkeley, California 94705 • (415) 841-9730

OFFICE OF  
ENVIRONMENTAL REVIEW

E 176.15

May 4, 1977

Ms. Selina Bendix  
Department of City Planning  
City of San Francisco  
100 Larkin Street  
San Francisco, California 94102

Re: Draft EIR 180 Montgomery Street

Dear Ms. Bendix:

Thank you for the opportunity to comment on the DEIR for 180 Montgomery Street. ABAG staff has reviewed the adequacy of this document in discussing impacts of regional significance. The following comments are those of staff and should not be construed as an official policy position of the Association.

According to the DEIR, this development will attract approximately 960 automobile round trips from outside San Francisco (p. 69) and hence would tend to increase commuting in contrast to ABAG policy which calls for decreased commuting and decreased dependence on the automobile (Regional Plan 1970-1990). Although the DEIR does discuss measures which could mitigate the effects of additional transit patronage (e.g. revised scheduling for the San Francisco Municipal Railway) on pages 70-72, these measures were omitted from the mitigation section of the report.

The DEIR should also recognize that measures to increase housing opportunities within San Francisco for units of an appropriate price/rent level commensurate with the estimated income levels of new employees could also serve to mitigate commuting impacts if undertaken in conjunction with improvements to MUNI. The final EIR should discuss the feasibility of implementing such measures.

In sum, while we feel the DEIR does an adequate job in documenting regionally significant impacts associated with this project, the mitigation section should be augmented to address the concerns raised above. If you have any questions on our comments please contact me.

Sincerely,

A handwritten signature in black ink that reads "John H. McKoy".

John H. McKoy  
Director of Planning  
and Programming

RESPONSE # 12: Concerning this project resulting in increased commuting with increased dependence on the automobile, it should be noted that this location in the heart of downtown San Francisco is that location which is best served by public transit and which would result in the least usage of private automobiles of any location in the Bay Area. This project would in fact be implementing goals of the Regional Plan to the extent that it is located in a place that can be best reached by transit.

Concerning mitigating measures for the effects on transit: MUNI staff regularly reviews transit patronage and schedules, and regularly reapportions its fleet to its different lines, mitigating project impacts on certain lines. Specific suggestions in this EIR for fleet reassignment would be out-of-date when required, and are beyond the scope of this report.

Concerning provision of increased housing opportunities within San Francisco: it is beyond the scope of the developer of a downtown highrise office building to provide housing for the employees of that building, but a residential zoning study is under way for which an EIR will assess impacts of the study on the provision of housing and will consider the need for housing in San Francisco.

COMMENT #13: Verbal comment delivered at public hearing May 12, 1977, by Charles Starbuck, San Francisco Planning Commissioner: "(Table 8) on page 69, which estimates the percent of San Francisco residents who will be working at the project, seems high and what I was going to request was that there be two tables here, one that would (be based on a population) emphasizing professional type firm ... (and one) based on a general downtown work force."

RESPONSE #13: The place of residence split was selected by staff as most representative of downtown highrise office building occupancy. Mr. Green, Transportation Planner, believes that this split may somewhat overestimate the proportion of San Francisco residents of the proposed building's occupants if the developer's expectations of the character of occupants are correct; suburban residence tends to increase as the income level of building occupants increase (a lower density professional office building would tend to have higher income level occupants than the conventional office building). No specific data is available at present to quantify this change for the proposed building. If the proportion of San Francisco residents decreased from the conventional percentage of 41% to 35% for the developer's expected higher income occupants, the impact on place of residence and modal split would be as shown in the table on the following page.

COMMENT #14: Verbal comment delivered at public hearing May 12, 1977, by Carol Webster, representing a member of the Zoning Committee of San Francisco Tomorrow: "First of all, San Francisco Tomorrow thinks that the Environmental Impact Report raises serious questions about whether this project should be approved at all. We regret that the project isn't slated for discretionary review ... This project raises a lot of problems in the fact that you consider downtown proposals project by project. Anyone says that their individual project is only a small increment and will not have that much effect on the overall congestion problem. They say that this project will not increase the cost of city government that much. Does a few thousand dollars here for transit subsidies, a few thousand there for the demand on sewer systems, a little more demand for peak hour electricity, etc. etc. And all those little amounts suddenly mean we have to spend \$2 billion on sewer facilities, new equipment has to be provided for MUNI, a new PG&E plant

TABLE

## PLACE OF RESIDENCE AND MODAL SPLIT OF EMPLOYEES OF PROPOSED PROJECT

	Location												Total		
	San Mateo / Santa Clara Counties						East Bay			Marin/Sonoma Counties			<u>No.</u>	<u>%</u>	
	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>	<u>No.</u>	<u>%</u>			
Number of Employees															
'Worst Case'	968	41%	401	17%	590	25%	368	27%	401	17%	258	19%	2,360	100%	1,360 100%
'Developer's Estimate'	476	35%	258	19%											
Mode of Travel															
<u>Auto</u>															
'Worst Case'	281	29%	138	29%	325	81%	209	81	342	58%	213	58	293	73%	1,241 52%
'Developer's Estimate'															748 55
<u>Transit</u>															
'Worst Case'	552	57	271	57	76	19	49	19	248	42	155	42	108	27	984 42
'Developer's Estimate'															545 40
<u>Walk</u>															
'Worst Case'	116	12	—	—	—	—	—	—	—	—	—	—	—	—	116 5
'Developer's Estimate'															57 4
<u>Other</u>															
'Worst Case'	19	2	10	2	—	—	—	—	—	—	—	—	19	1	10 1
'Developer's Estimate'															
Total															
'Worst Case'	968	100%	401	100%	590	100%	401	100%	2,360	100%					
'Developer's Estimate'	476	100%	258	100%	368	100%	258	100%	1,360	100%					

Sources: San Francisco Planning Department, Transportation Section, Ed Green; unpublished data from SPUR High Rise Study, Keyser Marston Associates.

has to be built on Potrero Hill and Market Street has to be increased to a six-lane freeway."

RESPONSE #14: The EIR states on pages 1, 36 and elsewhere that this proposed project is one element of the long-term growth in office-related activities presently occurring in the finance and administrative district and broader downtown area. Impacts of the proposed project are described. Cumulative impacts of such development trends are being examined in the Commerce and Industry study being conducted by the Department of City Planning. That and associated studies are examining specifically the economic impacts of development/employment alternatives available to the City, and will result in specific recommendations for action.

COMMENT #15: Verbal comment delivered at public hearing May 12, 1977, by Carol Webster, representing a member of the Zoning Committee of San Francisco Tomorrow: "The water and energy demands of this project are minimized in the EIR ... Page 103 (of Chapter V, Mitigation Measures Proposed to Minimize the Impact), entitled Energy Use is totally inadequate."

RESPONSE #15: Energy and water demands of this project as presented in the Draft EIR were based on general planning data. Continued design has resulted in more specific and accurate estimates of energy and water demand. See Response #11 for a discussion of mitigation and reduction of energy and water requirements.

COMMENT #16: Verbal comment delivered at public hearing May 12, 1977, by Carol Webster, representing a member of the Zoning Committee of San Francisco Tomorrow: "It's convenient and lucrative for the developer to build an office tower on this site. No alternative location outside the financial district is really considered."

RESPONSE #16: Alternative sites for the proposed project are discussed on pages 107-108 of the EIR. The developer has defined his market and financial parameters in a manner limiting his specific project to the core finance and administrative district. This market does not exist outside the core of the district. A demand exists in this area as projected by the Department of City Planning report Commercial Trends.<sup>1</sup>

COMMENT #17: Verbal comment delivered at public hearing May 12, 1977, by Carol Webster, representing a member of the Zoning Committee of San Francisco Tomorrow: "On pages 70 and 72 regarding transit ridership. All the systems operate at a deficit. Why doesn't the EIR say how much public money will have to subsidize the system? On pages 72 and 73 they use 1.3 persons per car in calculations for auto trips. But the text says that they will nearly all be in cars with just one driver and no passengers. And it also states that these professional people will make trips outside of the office, thereby increasing traffic in the streets. The results will be added new cars and more pressure for garages on the site of the International Hotel, Embarcadero and South of Market. Why shouldn't the EIR address the cumulative result of this pressure, and why doesn't it?"

RESPONSE #17: The 1976 annual operating cost of MUNI not covered by passenger revenues was \$46 million. "Worst case" ridership added by this project would represent approximately 0.2% of total average daily MUNI patronage. As noted on page 73 of the EIR, the factor of 1.3 passengers per auto may be high for the project as the higher-income professionals for which this project is planned tend to have more single occupant auto trips than the city average, but no specific data are available to make a more accurate estimate. The effect of additional trips by occupants during the

1. San Francisco Department of City Planning, Commercial Trends: Report Containing Background Information for the Commerce and Industry Element of the Comprehensive Plan of San Francisco, July 1975.

day and trips by visitors is expected to be mitigated by the central financial district location of the proposed building, and by the number of professional occupants who can be expected not to be in their offices at all during a day. The estimated increase in auto trips due to this project is presented on pages 72-75, and the mitigating effects of a central location in Response #12.

COMMENT #18: Verbal comment delivered at public hearing May 12, 1977, by Carol Webster, representing a member of the Zoning Committee of San Francisco Tomorrow: "Will this building be an asset or a liability to the energy and water resources of San Francisco? The EIR is not really clear. On page 89 it is stated that the air conditioning system could use up to 12,000 gallons of water a day. Multiply that times all the air conditioned buildings in San Francisco and you wonder how many dams will have to be built to accommodate this situation. Page 103, entitled 'Energy Use,' is totally inadequate. Why is the temperature range 68 to 78 degrees Fahrenheit? Why can't heat from lighting be used to cut down demands? Natural ventilation as described here is a farce. The reason why it is noisy and dirty when the windows are open is precisely because buildings like this are constructed and generate more auto traffic."

RESPONSE #18: Revised energy and water consumption characteristics and mitigation measures are discussed under Response #11. Peak daily water consumption of the project is currently estimated to be 64,000 gallons per August work day, 0.08% of average daily consumption of the City of San Francisco. Indoor temperatures noted on page 103 refer in general to 68° winter temperature and 78° summer temperature. The developer does propose to use heat from lighting to reduce cold weather energy demand. Use of natural ventilation is discussed on page 103. An "economizer cycle" as defined and discussed

on revised page 87 would result in energy savings through the mixing of outside air with return air reducing the volume of air that must be heated or cooled.

COMMENT #19: Verbal comment delivered at public hearing May 12, 1977, by Carol Webster, representing a member of the Zoning Committee, of San Francisco Tomorrow: "Use of the present building is almost totally disregarded. Given the importance of the existing structure which is of landmark quality, as far as we are concerned, [use of the existing building] should not be discounted."

RESPONSE #19: The consideration of "no-project" and continuing use of the existing three buildings on the site is discussed on pages 112-114. Landmark and visual qualities are discussed on pages 57-60; see also Response #4.

## I. SUMMARY

Corwin Booth and Michael T. Hall propose to develop a high-rise office building on the southeast corner of Bush and Montgomery Streets. The building would consist of a lobby/retail/~~plaza~~ ground floor level below a ~~23~~<sup>29</sup> PUBLIC SPACE ~~25~~ to ~~28~~-story<sup>1</sup> office tower. The building would provide approximately 349,000 net square feet of rentable office space and ~~4120~~ net sq ft of retail space; total gross occupied building area (excluding mechanical service floors) would be approximately ~~382,000~~ sq ft.

WITH 349,000 SQUARE FEET OF OFFICE SPACE

Population of the building /is estimated at between 1360 and 2360.

The developer's marketing intent and present tentative tenant commitments indicate the occupants would tend to be smaller professional firms active in the central finance and administrative district.

The project would take approximately 20 months to construct, and is expected to be completed during late 1979. It would require demolition of existing structures on the three assembled lots of the site. ON THE 19 FLOOR WITH THE STANDARD OIL BUILDING ADJACENT WOULD REQUIRE A CONDITIONAL USE PERMIT.

The proposed building would be located in the core area of the finance and administrative district of San Francisco's downtown area. This is an area already characterized by existing high-rise office buildings, and continued development of new buildings. The proposed project would be part of this general trend in the finance and administrative district, as is the First California Bank Building (under construction) and the proposed 595 Market Street Building (approved by project uncertain).

- 
1. Ultimate height is not presently determined, but impacts are calculated for a 29-story building as a conservative analysis.

## II. PROJECT DESCRIPTION

## A. OBJECTIVES OF DEVELOPMENT

25 31

Corwin Booth and Michael T. Hall propose to develop a 26- to 29-story office building at 180 Montgomery Street. The objectives sought by the proposed project are to meet demand for professional office space in the finance and administrative district<sup>1</sup> and thereby to maximize financial return on the investment in the proposed project and property.

## B. LOCATION AND BOUNDARIES

The proposed project occupies the southeast corner of Montgomery and Bush Streets, in the area generally referred to as the finance and administrative district within the central business district (CBD) of the City of San Francisco. The property consists of lots 6A, 6B, and 6C in Assessor's Block 289, and totals 18,580 sq ft in area (see Figure 1). The location within the downtown area is shown in Figure 2.

## C. DESCRIPTION OF THE PROPOSED PROJECT

23

29 The proposed building is a high-rise office tower between 25 and  
1 OR 2 LEVEL  
28 floors above a single-ground floor of lobby and retail space. SEE INSERT FOLLOWING THIS PAGE.

The proposed ground floor plan, shown in Figure 3, has a gross enclosed area of approximately 5900 sq ft. This includes a lobby area of approximately 750 net sq ft and two separated retail spaces of

1. The finance and administrative district is the area roughly bounded by Market, Powell, and Sacramento Streets. For a map and further description of this subarea, see Arthur D. Little, Inc., Commercial and Industrial Activity in San Francisco: Present Characteristics and Future Trends, (a report to the San Francisco Planning Department), June 1975, p. IV-56, Figure IV-5.

INSERT ON PAGE FIVE

The design originally proposed by the developer is shown in Figures 3 through 8 on pages 8 through 18. The developer anticipated that he would be allowed under the City Planning Code to build to a gross area of approximately 386,000 square feet. However, approximately 39,000 square feet of this building area is dependent upon City approval of a public plaza proposed by the developer on the site. The Zoning Administrator and Planning Department staff have reviewed the design of the proposed building and plaza, and have questioned whether the plaza as designed is satisfactory to the intent of applicable ordinances.

As no formal determination will be made prior to certification, the Draft EIR identified the characteristics of the proposed project as between 26 and 29 stories high, and between 342,000 and 382,000 square feet in area. The discussions conducted between the developer and City Staff concurrent with review of the Draft EIR and further additional design of the project have resulted in design modifications intended as measures to mitigate impacts. At the time of Final EIR preparation, design of the building ground floor and plaza is as shown on Figure 3A. Width of the office tower was reduced approximately 5 feet, and height of the building consequently increased to 31 stories to accommodate the same anticipated allowable floor area.

If agreement concerning plaza design and approval for bonus building floor area cannot be achieved, the suggested plaza area may instead be developed as a two level retail and office extension of the building. This would result

INSERT (CONTINUATION OF INSERT TO PAGE 5)

in a design providing approximately 12,000 net square feet retail space (roughly 8000 square feet more than the building initially proposed) and 263,000 net square feet office space (roughly 86,000 net square feet less than initially proposed). The building would thereby be reduced to 25 stories in height.

Impacts of the proposed project were analyzed on a "worst case" basis in the EIR, assuming a 29-story building of 382,000 square feet gross with the plaza space as initially proposed. Improvements to plaza design are discussed under mitigating measures. Differences in impact are identified where pertinent in Chapters IV and V.

BUSH STREET

MONTGOMERY STREET

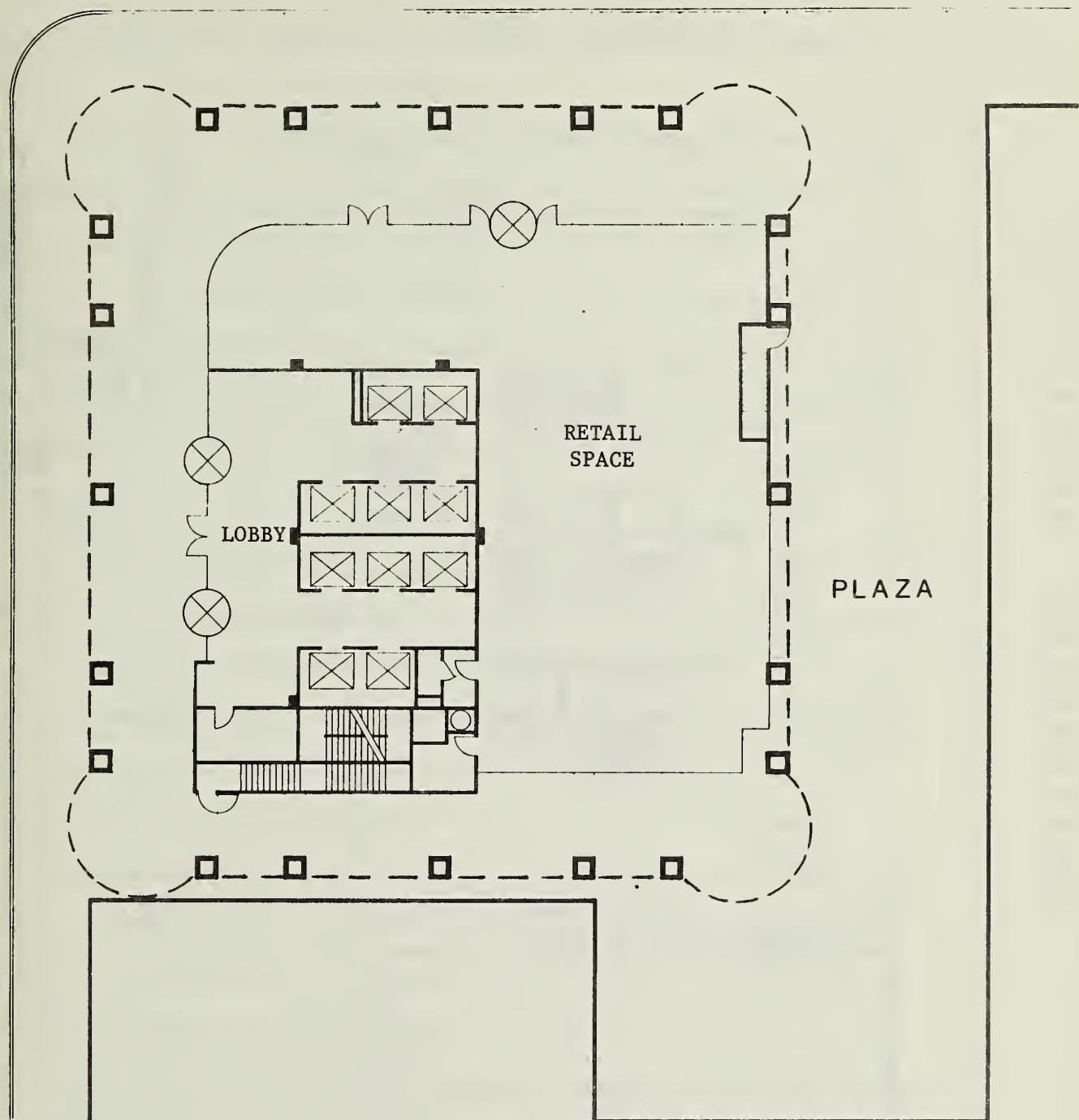


FIGURE 3A: REVISED GROUND FLOOR PLAN, 31-STORY BUILDING

Source: Corwin Booth &amp; Associated Architects

## BUSH STREET

MONTGOMERY STREET

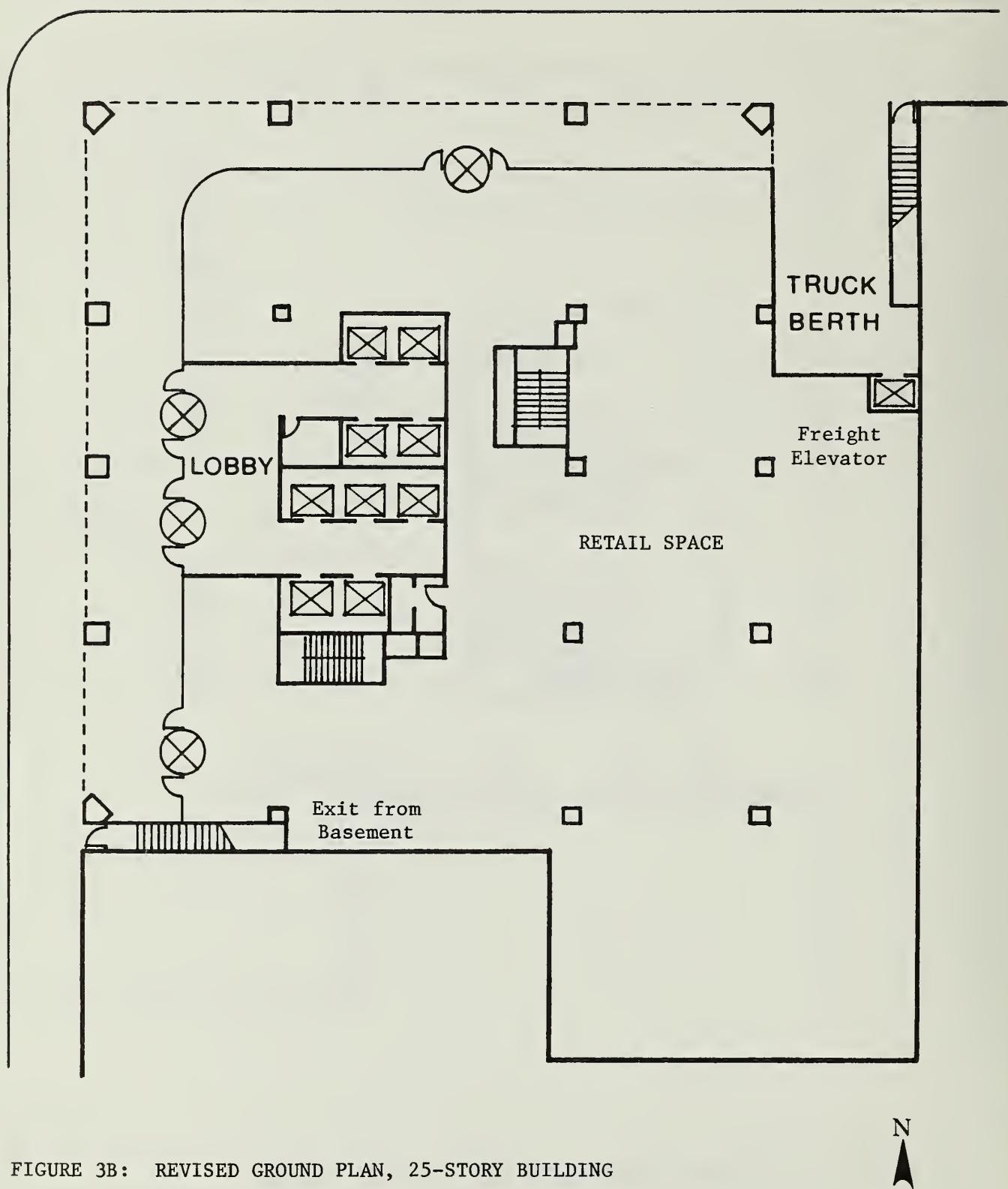


FIGURE 3B: REVISED GROUND PLAN, 25-STORY BUILDING

Source: Corwin Booth &amp; Associated Architects

approximately 3000 and 1100 net sq. ft. each. No tenants are presently identified for these retail spaces. It is possible that a retail banking unit may occupy the larger of the two spaces, although other sales-oriented activities are anticipated.

Entrance to the office tower would be via Montgomery Street. The Montgomery Street and Bush Street ground floor facades would be set back from the existing sidewalk line roughly 20 feet, to provide for pedestrian circulation. The ground floor facades on the other two sides would also be recessed approximately 10 feet, allowing circulation completely around the building. The building itself would be set back 25 feet from the east property line<sup>1</sup> and a plaza provided for use by building occupants and the public.

A single basement level of approximately 13,400 sq. ft. and a mechanical level of approximately 13,400 sq. ft. at the top of the tower are anticipated to be occupied by mechanical and building service equipment. A service dock area and parking for two service vehicles would be provided on the north side of the proposed building, accessing from Bush Street. No parking would be provided in the building.

The typical office tower floors shown in Figures 4 and 5 are nearly square rectangles of approximately 13,400 gross sq. ft., served by a central core of elevators and building support spaces. A typical lower floor net rentable area of approximately 12,400 sq. ft. is expected.

A small pedestrian bridge is proposed between the 19th floor of this building and the adjacent Standard Oil Building. The bridge would connect space to be leased by a present tenant of the Standard Oil Building and would be for the exclusive use of that tenant. A CONDITIONAL USE AUTHORIZATION WOULD BE REQUIRED.

- 
1. A deeded air rights easement extends horizontally 25 feet west from the east property line, upward from the roof of the existing Title Insurance Building.

TABLE 1A

## APPROXIMATE BUILDING AREAS AND DIMENSIONS

Planning Code Allowance and As Proposed  
 (25 Story Building Proposal)

<u>Floor Area Ratio (FAR) Allowance:</u>	*	260,100 sq. ft. allowed
<u>Bonus Area Allowed For:</u>	*	
Rapid Transit Proximity		10,500
Multiple Building Entrances		13,005
Sidewalk Widening		19,817
Side Setback		<u>23,025</u>
TOTAL BONUS AREA		66,422 sq. ft. allowed
<u>Total Building Area Allowance</u>		
Floor Area Ration (FAR) + Total Bonus Area		326,528 sq. ft. allowed
<u>Derivation of Building Height</u>		
Ground Floor Area		15,048
2nd Floor Area		11,862.75
Upper Floor Area @ 12,993.75 x 23		<u>298,856.25</u>
Total Building Area @ 25 Stories		325,767 Square Feet
Total Allowance		326,528
Less Area Used		<u>- 325,767</u>
		761 Square Feet Unused

\*The FAR and Bonus Area calculations are given in Appendix B.

TABLE 1A (Continued)

Site Coverage (building floor area ÷ site area)

Proposed:             $15,048 \div 18,579 = 81\%$

Permitted:            100%

<u>Maximum Dimensions</u>	<u>Proposed</u>	<u>Permitted</u>
Height Above Grade	338 feet	500 feet
Building Length	115.5 feet	170 feet
Diagonal Dimension	162 feet	200 feet

Building Area Proposed

Total Occupied Building Area	325,767 **
Total Gross Area (including mechanical/ service floors)	335,181 **
Net Rentable Area	274,559
Office	262,776
Retail	11,783

\*\* Building includes one roof level floor and one basement of approximately 9,414 square feet total, housing mechanical/building service functions not included in FAR consideration. Penthouse enclosure on roof covers the protrusion through the roof of elevator shafts and equipment.

175 sq. ft. per person. Specific individual offices in these buildings have densities of 250 net sq. ft. or more per person.

Based upon the tenants now tentatively anticipated and committed, the developer estimates that the total occupancy of the building would be approximately 1360 people.

In order to provide a worst case analysis of the impacts of the building, a factor of 150 net sq. ft. per person will be used in this report for calculations, resulting in an assumed building population of 2360.

The building project is in the schematic design state and only broad characteristics are defined. The size of the building is defined as between 25 and 31 floors. Refinements in design and building area may occur as the design is completed. Impacts have been described in this report in general on a conservative, worst case basis; a 29-story building has been assumed for most specific calculations. The final design of the proposed building is subject to possible detailed design review by the city staff and Planning Commission through the discretionary review power of the City Planning Commission.<sup>1</sup>

The firm of Skidmore, Owings & Merrill, Architects-Engineers, San Francisco, has been responsible for preliminary design work-to-date. The firms of Corwin Booth And Associated Architects/would be responsible for completion of design.

The developer and architects presently anticipate that work on the site would begin with demolition of existing buildings in late 1977 and

- 
1. Under the charter of the City and County of San Francisco, the City Planning Commission has the power to exercise its sound discretion over any permit application subject to review and approval by the City Planning Department.

It has been assumed that the place of residence distribution of the employees of the proposed building would be the same as for present downtown office workers.

TABLE 8

PLACE OF RESIDENCE AND MODAL SPLIT OF  
EMPLOYEES ADDED BY PROPOSED PROJECT

<u>Location</u>	<u>Number of Employees</u>		<u>Mode of Travel</u>							
	<u>Number</u>	<u>%</u>	<u>Auto Number</u>	<u>%</u>	<u>Transit Number</u>	<u>%</u>	<u>Walk Number</u>	<u>%</u>	<u>Other Number</u>	<u>%</u>
San Francisco	968	41	281	29	552	57	116	12	19	2
San Mateo/ Santa Clara Co.	401	17	525	81	76	19	-	-	-	-
East Bay	590	25	342	58	248	42	-	-	-	-
Marin/Sonoma Co.	401	17	293	73	108	27	-	-	-	-
Total	2,360	100%	1,241	53%	984	42%	115	5%	19	1%

Sources: San Francisco Planning Department, Ed Green, Transportation Section; Unpublished data from SPUR High Rise Study; Keyser Marston Associates

Within roughly two blocks of the site, one office building is in the construction phase and another has received certification of its EIR but construction is uncertain. The partially completed building is on the north-east corner of California and Sansome. It will be 23 stories, contain 348,000 sq.ft., and be occupied by approximately 1100 persons. The building whose EIR has been certified is proposed for the southeast corner of Second and Market, it will have a gross floor area of 428,000 sq. ft. and will be occupied by an estimated 2665 persons. Table 9 gives the estimated transit/non-transit split for the future occupants of these buildings along with the split for the occupants of the proposed building.

buildings by approximately 20 dBA,<sup>1</sup> resulting in a noise level from the piledriver of approximately 80 dBA. The average office has an ambient noise level of 70-75 dBA.<sup>2</sup>

#### K. BIOTA

Landscape for the proposed plaza area is expected to include plant material, but the character of landscaping has not been determined at this time. Selection of suitable species would be difficult due to the wind exposure and lack of sunlight in the proposed plaza. Street trees on the Montgomery Street side of the site would be removed during the construction period, but replaced in the final phase. No landscaping anticipated would be a likely habitat for animal species.

#### I. ENERGY USE

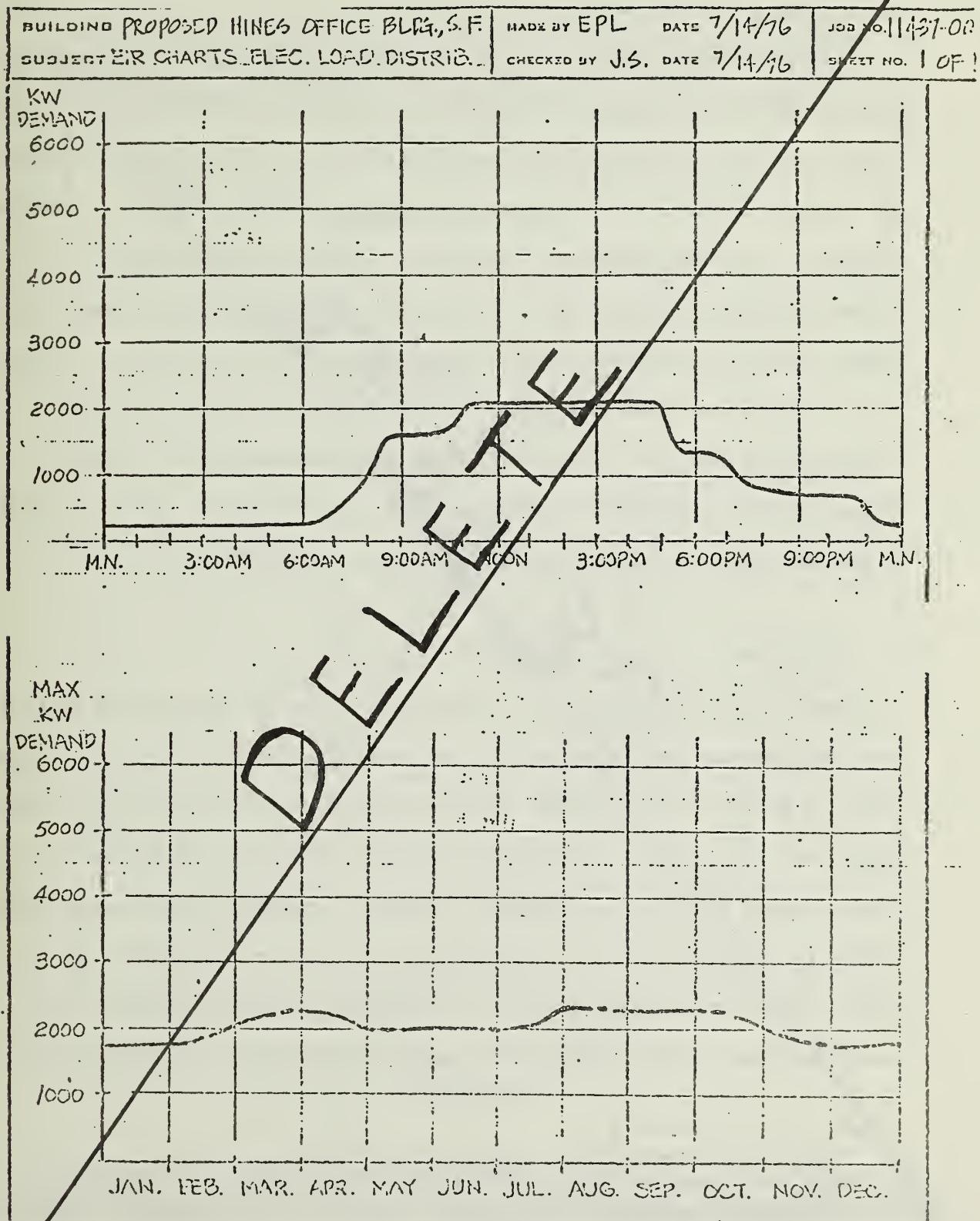
The connected kilowatt load of the project is estimated by the project architect/engineer at 5400 kilowatts. The estimated average kilowatt hours of monthly consumption required to service all electrical needs: (1) in absolute amount are estimated at 620,000 kWh, and (2) per square foot interior space are estimated at .6 kWh. Anticipated daily and annual electrical load distribution curves are shown in Figure 18.

Estimated average consumption of fuel oil (fossil fuels) in British Thermal Units (BTU's) per square foot of interior floor space per day is estimated by the project architect/engineer as 123 BTU/square foot/day.

The maximum peak demand of fossil fuel consumption would be 8 million BTU/

- 
5. Robert MacDonough, op. cit.
  6. Robert MacDonough, ibid.

FIGURE 18

ANTICIPATED DAILY AND ANNUAL ELECTRICAL  
LOAD DISTRIBUTION

Source: Skidmore, Owings &amp; Merrill, Architects &amp; Engineers

hour. Anticipated daily and annual load distribution curves for fuel

oil consumption are shown in Figures 19 and 20. Use is primarily for space heating and hot water.

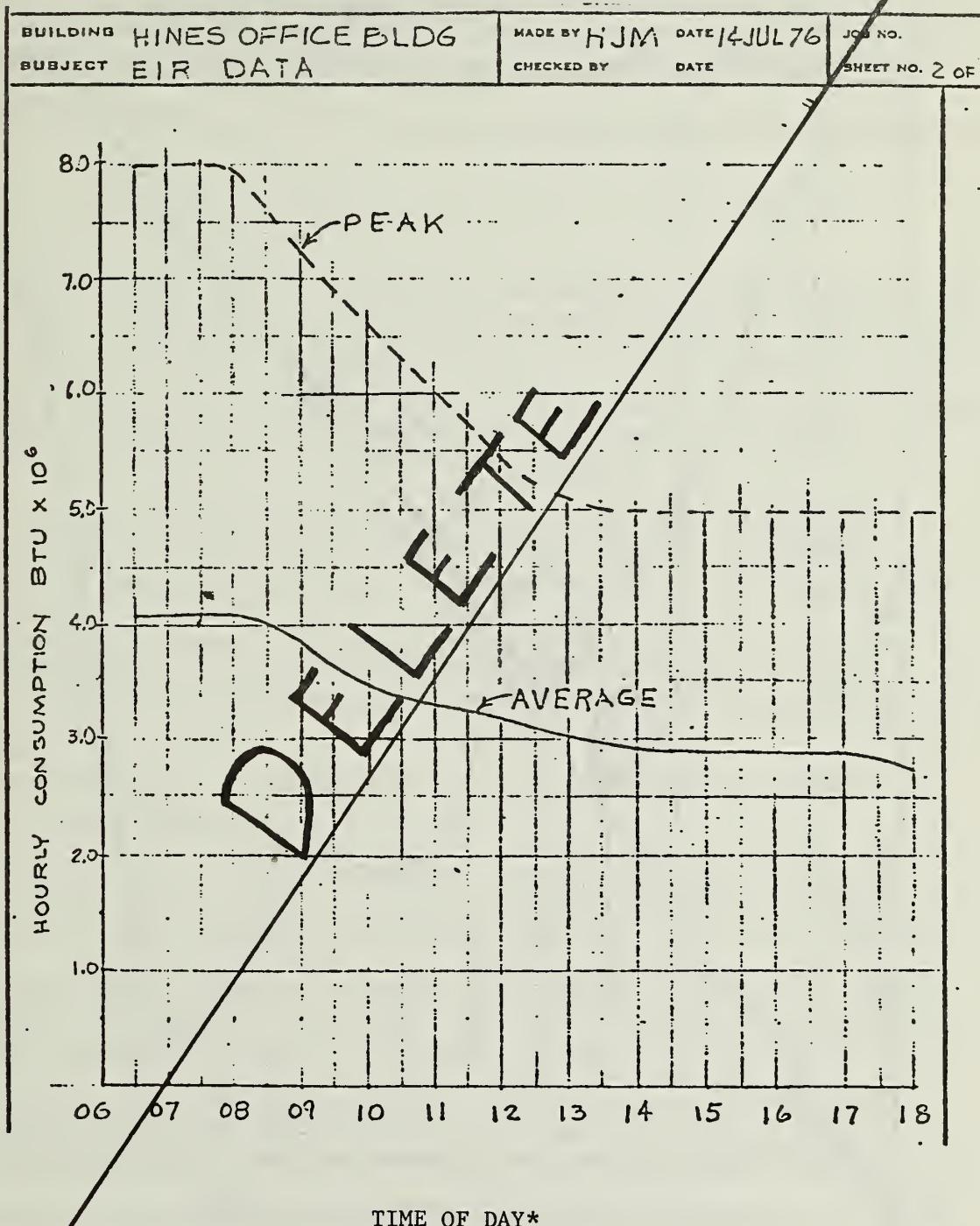
Since the mechanical and electrical systems for the proposed building have not yet been designed, the engineers have derived the data by extrapolation from the California First Bank Building<sup>1</sup> being built at California and Sansome streets,<sup>2</sup> also designed by Skidmore, Owings & Merrill, Architects-Engineers, and from PG&E meter readings of several existing local office buildings adjusted for this project. The proposed building is 11% larger than the California First Bank Building, the conversion efficiency of oil is 11% less than gas (the fuel used in the California First Bank Building), and the proposed building is estimated to be 11% more energy efficient than the California First Bank Building. The worksheets of the engineers are contained in Appendix G, page 187.

#### M. WATER USE

Water would be required for domestic use such as sanitation, drinking, and cooling tower operation. The project architects/engineers, Skidmore Owings & Merrill, on the basis of their experience with similar buildings, state that they expect the proposed building to consume approximately 15 gallons of water per day per building occupant. This results in approximately 35,000 gallons of water per day that would be required to serve 2360 occupants of the proposed building. In addition, the design engineer calculates that the cooling system will consume from zero to 12,000 gallons per

- 
1. Final Environmental Impact Report EE 74.170.
  2. This extrapolation was discussed with Alec Bash of the Office of Environmental Review, July 1976.

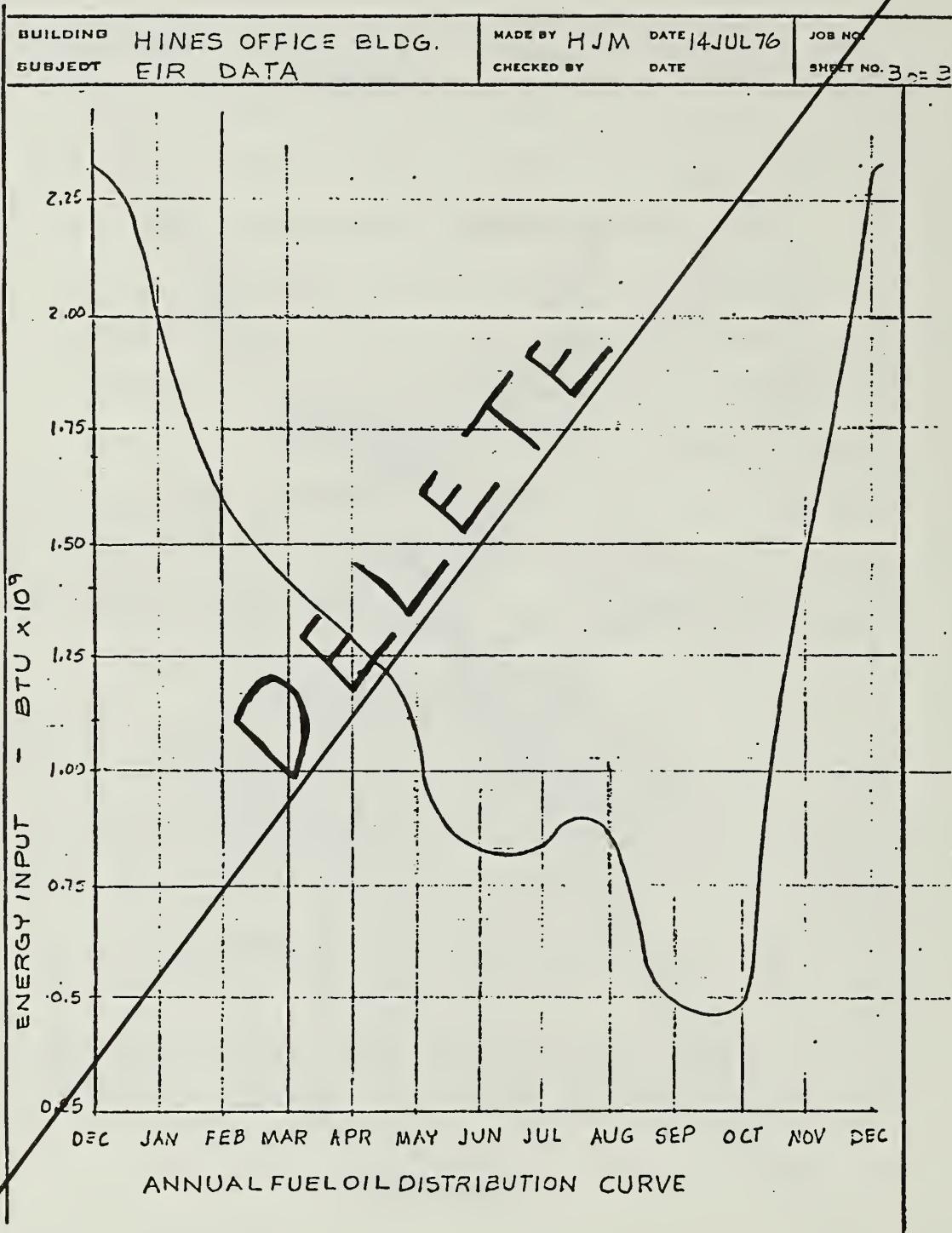
FIGURE 10  
DAILY FUEL OIL DISTRIBUTION CURVE



\*Design assumes that the heating/cooling system will operate only on a 0600-1800 basis and no fuel oil will be consumed at night. This assumption will be revised only if energy consumption is thereby reduced.

Source: Skidmore, Owings & Merrill, Architects & Engineers.

FIGURE 20  
ANNUAL FUEL OIL DISTRIBUTION CURVE



Source: Skidmore, Owings & Merrill, Architects & Engineers

~~day of water, depending on the level of operation and the weather. This cooling consumption would be the result of losses due to evaporation, wind drift, and periodic bleeding of the system to reduce mineralization. Total consumption is therefore estimated to vary from 35,000 to 47,000 gallons per day.~~

~~DELETE~~

#### N. SURFACE AND GROUNDWATER

The site is presently covered by buildings; no changes in drainage and runoff are expected as a result of replacement of the existing buildings by the proposed building. Runoff would continue to be directed into the city's combined storm-sanitary sewer system.

As site excavation would be limited to the depth required for a single basement and the foundations, the developer's consultants expect groundwater problems during construction to be limited. Any water that does enter the excavation would be pumped into the storm-sanitary sewer system.

#### O. LIQUID WASTES

The project architects/engineers, Skidmore, Owings & Merrill, on the basis of their experience with similar buildings, state that they expect the proposed building to generate approximately 15 gallons of liquid waste per day for each person employed in the building. This results in approximately 35,000 gallons of liquid waste per day that would be discharged into the city's sanitary sewer system. The discharge will be handled by the North Point Sewage Treatment Plant, and would constitute

buildings by approximately 20 dBA,<sup>1</sup> resulting in a noise level from the piledriver of approximately 80 dBA. The average office has an ambient noise level of 70-75 dBA.<sup>2</sup>

#### K. BIOTA

Landscaping for the proposed plaza area is expected to include plant material, but the character of landscaping has not been determined at this time. Selection of suitable species would be difficult due to the wind exposure and lack of sunlight in the proposed plaza. Street trees on the Montgomery Street side of the site would be removed during the construction period, but replaced in the final phase. No landscaping anticipated would be a likely habitat for animal species.

#### L. ENERGY USE

Preliminary designs for the mechanical and electrical systems for this building were completed in June, 1977, allowing computation of an energy and water consumption profile.

The heating, cooling, ventilating and lighting systems have been designed to be within the criteria of presently proposed energy limitations of California Administrative Code, Title 24.

The lighting criteria is based on 75 foot candles of lighting instead of the historical standard of 100 foot candles. This energy savings also is reflected to air conditioning energy savings. Lighting would also be locally controlled, which would further reduce power use from the calculated demand below.

The air conditioning cooling system would be of variable volume design so that no reheating of cooled air is required. Every other floor would

have its own fan system so that the entire building would not have to be on the line when only portions are occupied. Each fan system would have an economy cycle. When the outside air is 70° D.B. or less, the fan system would deliver 100% outside air since the air is colder than the return air from the occupied spaces. This would reduce the energy demand of the cooling plant progressively until the outside air is 52°. At that point the cooling plant is off the line and all the air conditioning is done by outside air. As the temperature goes below 52°, the outside air would start closing and mixing with return air to maintain the 52° and not add heating load. This would be all done automatically. This operation is comparable to opening outside windows, except that the system also is taking care of internal rooms. The variable volume concept reduces the volume of air supplied in proportion to demand in such a manner that the energy used by the fan motors also reduces.

The Trane Co. of LaCrosse, Wisconsin (one of the oldest and largest manufacturers of air conditioning machinery and systems) has established an air conditioning Economics Computer Program (TRACE) to verify system designs and project an average operating cost. They have in their program the weather records of most cities in the United States, including San Francisco. The design characteristics of the proposed project were run on the TRACE computer program by the project design engineer. Basic system characteristics and consumption findings are tabulated in Appendix G; a copy of the TRACE readouts for this building for the year 1978 is on file in the City Planning Department office.

A summary of this data, based on system operation 12 hours per day

for five days per week shows the average per month electrical usage as follows:

Lighting	264,850 KW
Misc. power (elevators, etc.)	25,963 KW
Heating & air conditioning	<u>157,383 KW</u>
	TOTAL
	448,196 KW per month, average

This is 13.15 KW per year per gross sq. ft. of the building -- 1.09 KWH per month. The program indicates that the peak electrical demand would be 2198 KW. Anticipated daily and annual electrical load distribution curves are shown in Figure 18.

Heating for this building would be district steam supplied from PG&E, similar to services provided several other office buildings in the area. This steam would be converted to hot water for space heating. In the space above the ceiling on each floor there would be a multiple of supply air fans with hot water heating coils supplying warm air to the perimeter of the floor. Multiple units are installed so heat is only supplied on the exposure that requires it. Since 40% of the heat from the lighting goes into the ceiling space, this heat is captured using the ceiling space air through the fancoil units. The basic hot water would not be opened to each coil until the captured heat from the lights is unable to provide the occupancy comfort. After the steam condenses to hot water, a second use of this energy would be made by supplying it to the heating coils that furnish warm air to the 1st and 2nd floors.

The heating would require, according to TRACE program analysis, 38,202 therms of steam per year with a monthly (January) peak of 5761 therms and minimum month (August) of 1062 therms of steam. The building would require

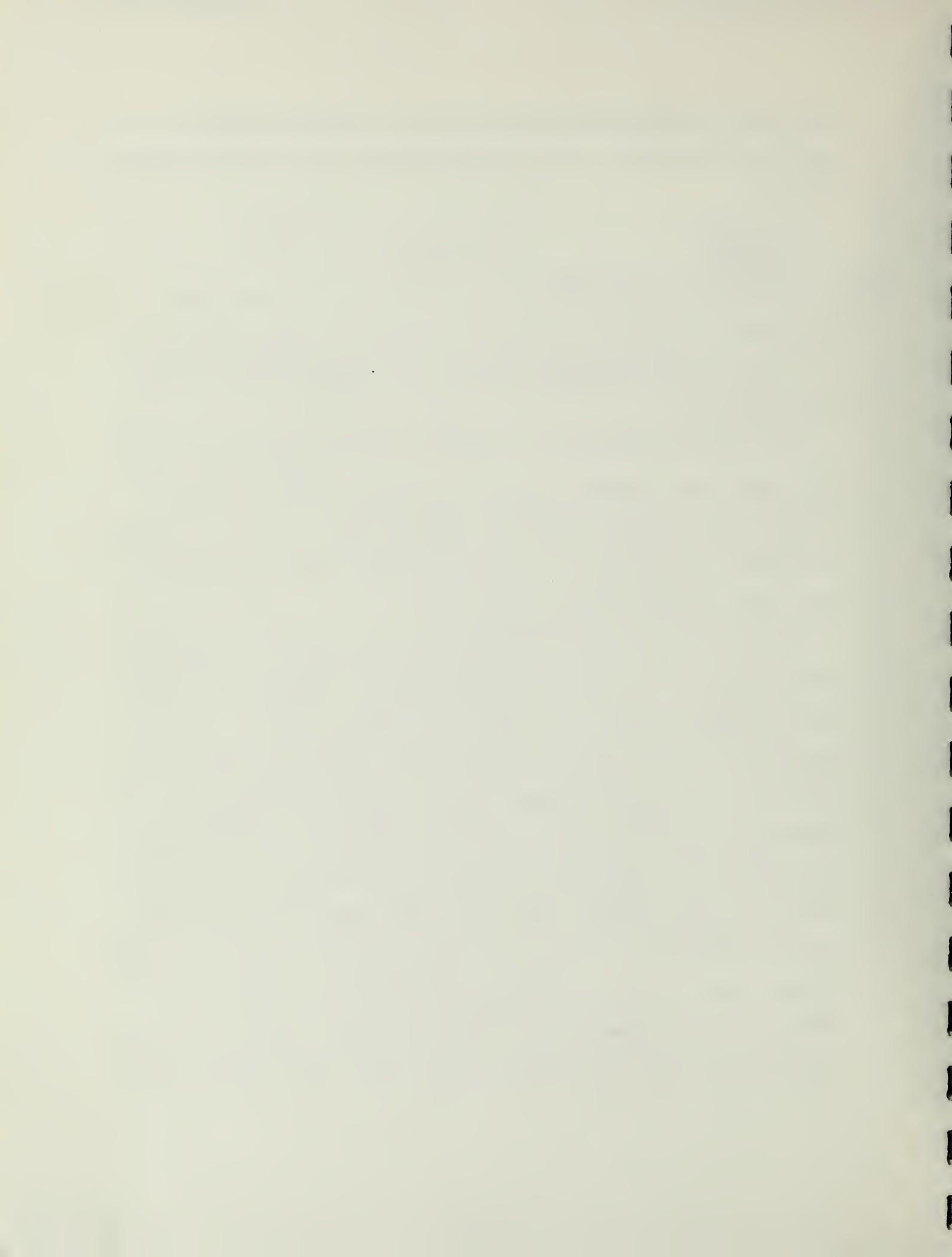
10.82 lbs. of steam per gross sq. ft. per year. Anticipated daily and annual load distribution curves for steam consumption are shown in Figures 19 and 20.

#### M. WATER USE

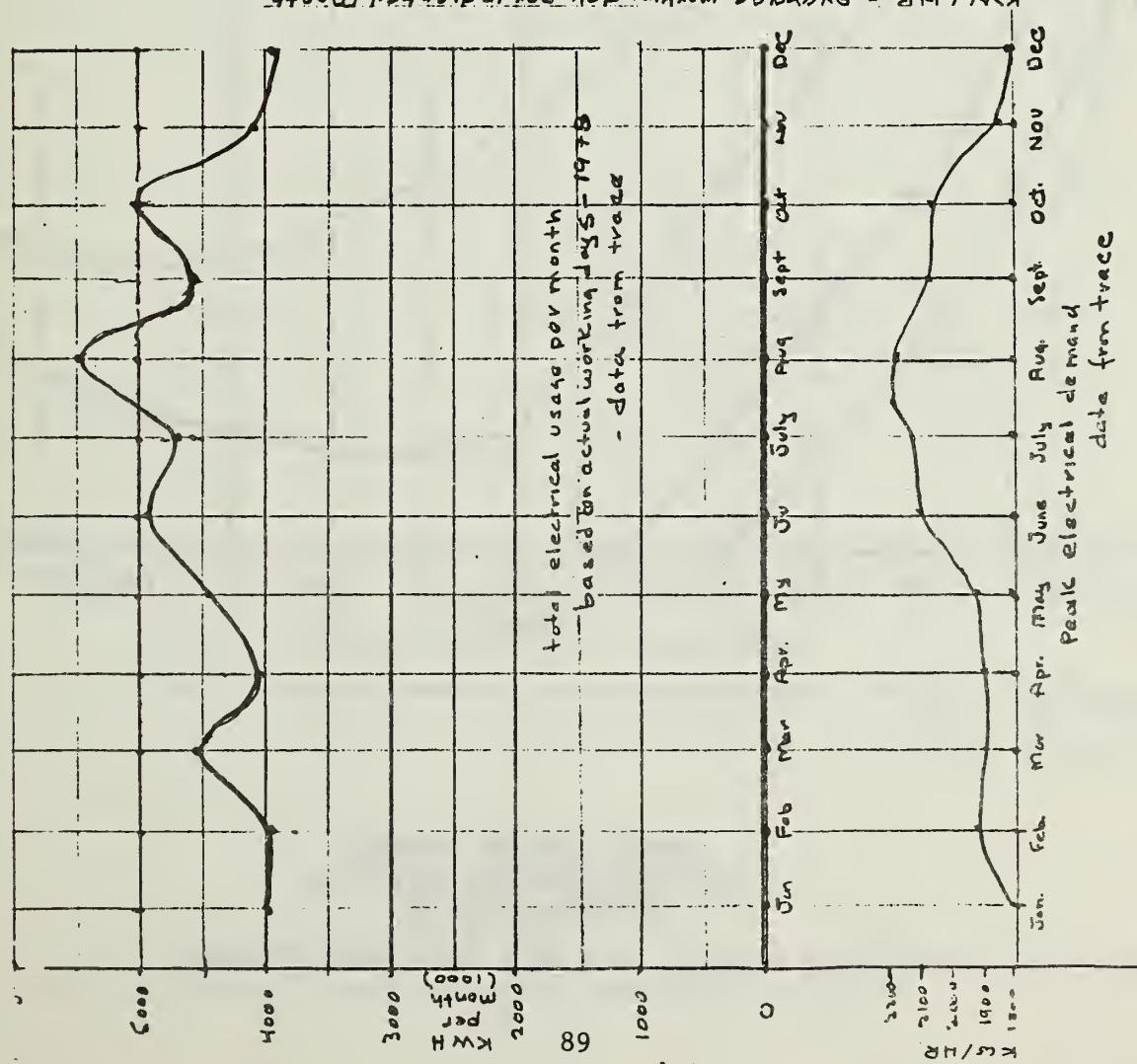
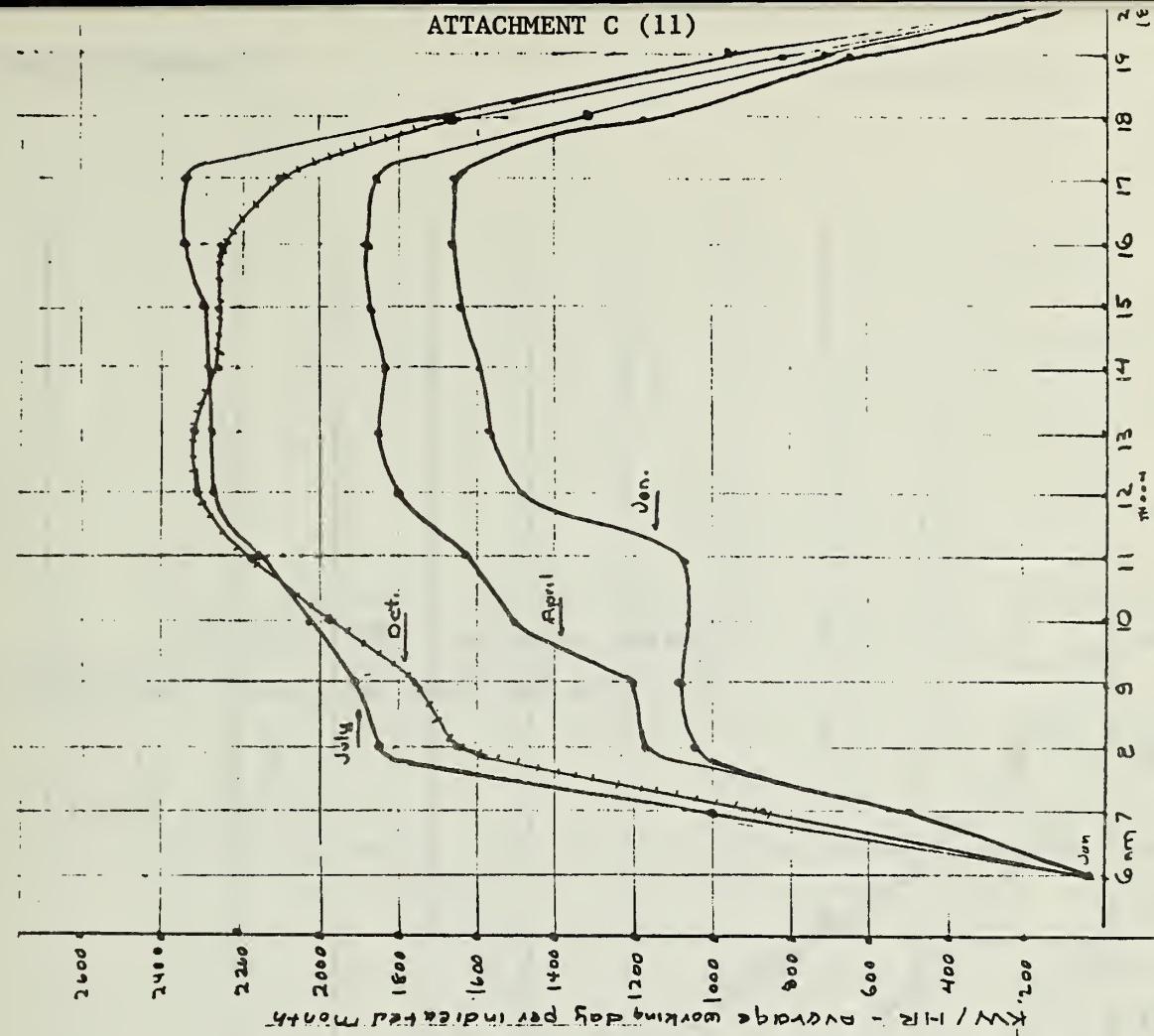
The preliminary designs of mechanical and electrical systems for this proposed building were completed in June, 1977, allowing computation of an energy and water consumption profile in the manner described above under Energy Use.

Water would be required for domestic use such as sanitation, drinking, and cooling tower operation. Sanitation and drinking uses are estimated to require approximately 15 gallons of water per day per building occupant. This results in approximately 35,000 gallons of water per day required to serve 2360 occupants of the proposed building.

Cooling towers on the air conditioning system require a considerable amount of makeup water. Part of this water is the continuous bleedoff to keep the dissolved solids in the tower at a minimum so as not to lime up the equipment. This bleedoff is usually a fixed amount at a 100% cooling operation. A dissolved solid measuring device would be installed to provide only the required amount of bleedoff, depending on the percent of cooling operations (resulting in a savings of 19,500 gallons of water per month on an annual average). The cooling towers would require with fixed bleed an average of 14,500 gallons of makeup water per day. The peak monthly (August) consumption would be 669,000 gallons per month and the minimum monthly (January) consumption would be 91,000 gallons. Use would occur only on working days, when the system was in operation. Daily consumption would



ATTACHMENT C (11)



HOURLY ELECTRIC POWER USAGE  
180 Montgomery St. Building  
San Francisco, Ca.

FIGURE 18

MONTHLY ELECTRIC POWER USAGE  
180 Montgomery St. Building  
San Francisco, Ca.

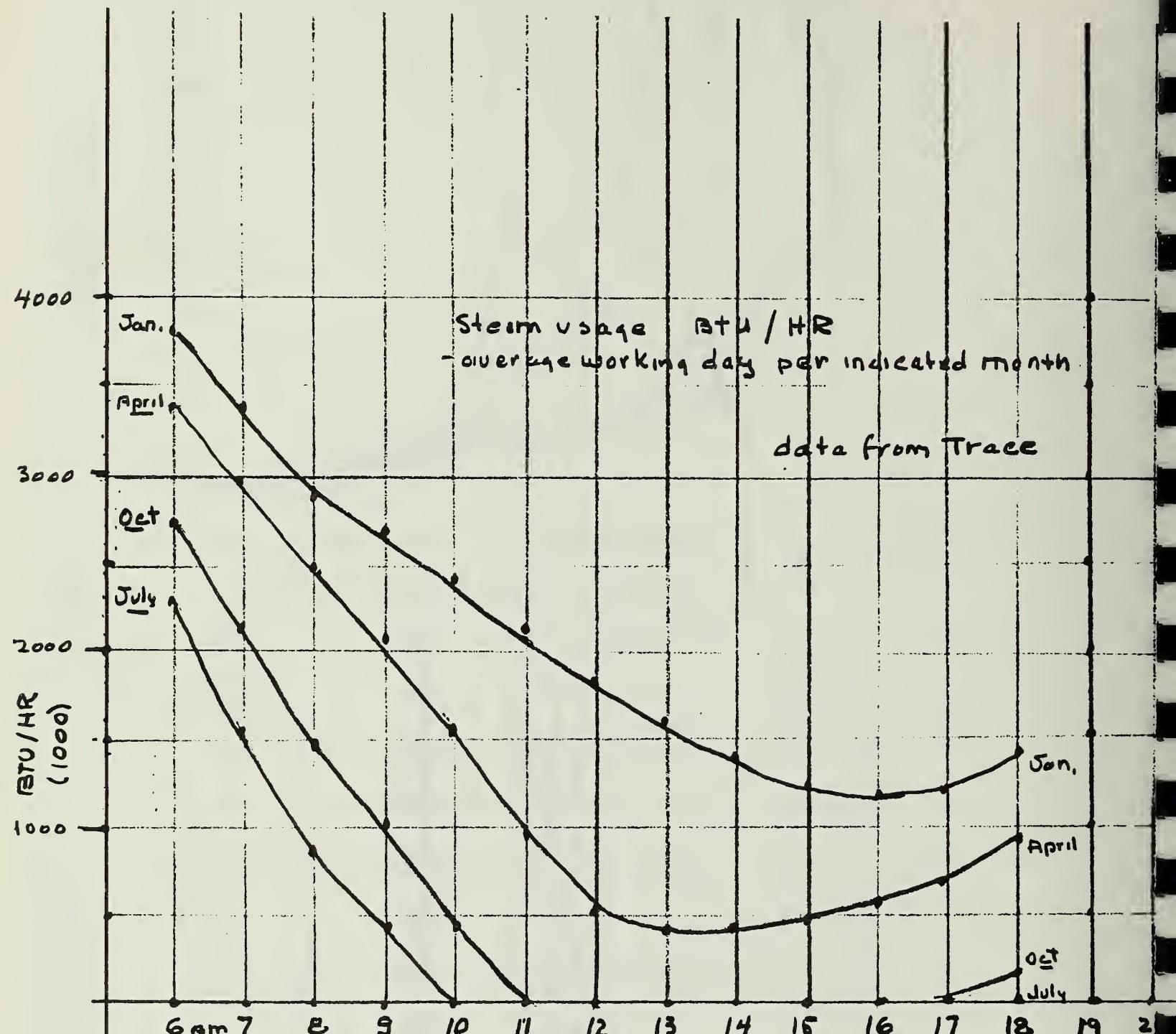


Figure 19

HOURLY HEATING DEMAND  
180 Montgomery St. Building  
San Francisco Ca.

Source: Air Conditioning Company, Inc; Data from TRACE Program

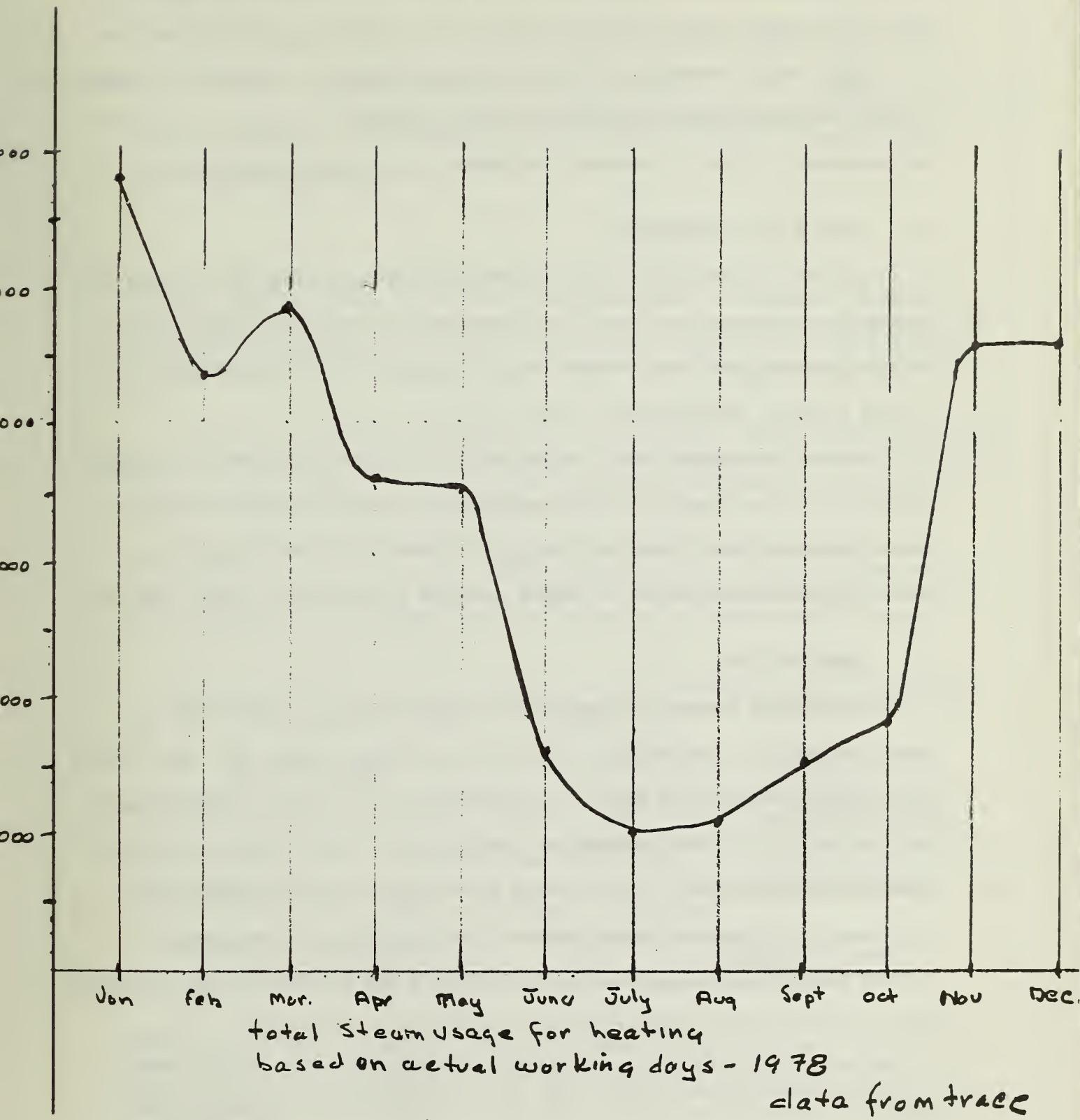


Figure 20

MONTHLY HEATING DEMAND  
180 Montgomery St. Building  
San Francisco Ca.

Source: Air Conditioning Company, Inc; Data from TRACE Program

be approximately 29,000 gallons and 4300 gallons for August and January. A small additional amount of water would be lost due to evaporation and wind drift.

Total water consumption of the proposed project is estimated to range from a high of approximately 64,000 gallons per work day in August to a low of approximately 40,000 in January, responsive to air conditioning load.

#### N. SURFACE AND GROUNDWATER

The site is presently covered by buildings; no changes in drainage and runoff are expected as a result of replacement of the existing buildings by the proposed building. Runoff would continue to be directed into the city's combined storm-sanitary sewer system.

As site excavation would be limited to the depth required for a single basement and the foundations, the developer's consultants expect groundwater problems during construction to be limited. Any water that does enter the excavation would be pumped into the storm-sanitary sewer system.

#### O. LIQUID WASTES

The project architects/engineers, Skidmore, Owings & Merrill, on the basis of their experience with similar buildings, state that they expect the proposed building to generate approximately 15 gallons of liquid waste per day for each person employed in the building. This results in approximately 35,000 gallons of liquid waste per day that would be discharged into the city's sanitary sewer system. The discharge will be handled by the North Point Sewage Treatment Plant, and the discharge would constitute

## I. ENERGY USE

Energy conservation is a primary design objective today, both because of the cost of energy and because of recent legislation that mandates conservation measures. The building-design engineers/comment below on four specific considerations:<sup>1</sup>

"A. Natural Ventilation: Natural ventilation is impractical on the building interior spaces. Although it can be done with operable windows for perimeter spaces, energy is only one consideration. Other considerations include temperature comfort levels in the summer, wind, street noises, infiltration of unfiltered air (as it affects house cleaning) and investment costs.

"The use of operable windows in lieu of mechanical ventilation and cooling would obviously reduce energy consumption. Such reductions would be partially offset, however, by additional heating energy requirements to overcome infiltration of cold air through window cracks.

"B. Alternate Mechanical Systems: A variable air volume system is planned for this project. This system is more energy conserving than other systems that might be considered. Such other systems include reheat, multi-zone, double-duct, air-water induction, fan-coil, package units, electro-hydrionic and through-the-wall.

"The planned air system will incorporate an economizer cycle to optimize the percentage of outside air and employ, to the extent possible, free cooling with 100% outside air, with the chillers off.

"C. Double-Glazing: The building temperatures are maintained in the range of 68° - 78°F. The average outdoor temperature is approximately 55°F. The outdoor temperature is in the range of 50° - 75°F approximately 79% of the time. During these hours there is either (1) no heat conduction through the windows, or (2) heat transfer from the building to the out-of-doors. This heat transfer is constructive since it naturally removes from the building the heat generated by lighting, machines, and people.

"The value of double-glazing in the San Francisco climate is quite doubtful for major office structures.

"D. Solar Energy: In this comparatively mild climate, passive solar energy (i.e., solar radiation through windows) already provides a significant amount of the building space heating requirements. Use of active solar energy collectors requires much more area than is available on the roof of the building, and the west and north faces of the building are functionally inappropriate."

INSERT HERE STARTING WITH PAGE 103A.

---

1. Carl Jordan, mechanical engineer, Skidmore, Owings & Merrill, Architects-Engineers, memorandum dated December 23, 1976 and personal communication.

As discussed on page 87, preliminary designs for the mechanical and electrical systems of this proposed building were completed in June, 1977, allowing update of energy consumption information in the draft EIR that had been based on only general planning factors. A number of specific design provisions that significantly reduce potential energy demand have been incorporated in the preliminary design, in addition to the use of a variable air volume system with economizer cycle as identified above for the proposed building. These additional items are described on page 87 of the Final EIR, and include reduced light levels, local switching control, use of heat from lighting, and use of local heating units.

A major change in mechanical design was the decision to use district steam from the PG&E power plant for heating rather than an oil fired boiler in the building. District steam now serves several office buildings in the area. It is advantageous because of the increased efficiency of energy utilization resulting from the scale and character of the PG&E plant, whose primary function is generation of electrical power. A second advantage is the flexibility presented by a large centralized unit such as the PG&E plant, compared to a small oil-fired unit installed in an individual building, to respond to changes in fuel cost and availability. For example, it may be found feasible in the future to convert the district steam generation system to use fuel derived from recovered solid wastes, an action that would be impractical for an individual office building boiler. At present, the PG&E unit can use either natural gas or oil as fuel.

There are design modifications that would further reduce the energy consumption. These are not being considered at this time by the developer

because he believes the substantial added cost in relation to saving would be prohibitive and would jeopardize the ability to build this structure.

If the air quantity passed through the system were doubled by installing full size air handlers on every floor rather than every other floor and doubling the size of the supply air ductwork and air outlets, the cooling system would go off the line completely when the outdoor temperature drops to 60° instead of 52°. This would produce a substantial savings in energy consumption. However, beside losing 6000 sq. ft. of rentable space, the investment is increased by approximately \$1,500,000. It is feasible to do this in the future should energy costs increase to such an extent as to make this economically possible.

It is also possible to install large insulated storage tanks, one for chilled water and one for hot water. This would not reduce the total amount of energy used but would shade the peak loads by operating during night hours. Some dollar savings would be accomplished by a lower demand charge.

DELETE PAGES 187 THROUGH 189.

REPLACE WITH FOLLOWING TWO TABLES: PAGES 187 AND 188.

## APPENDIX G

SKIDMORE, OWINGS & MERRILL  
ARCHITECTS - ENGINEERS

## ENGINEERING DEPARTMENT CALCULATIONS

BUILDING PROPOSED HINES OFF. BLDG S.E.	MADE BY HJM	DATE 15 JUL 76	JOB NO 11437-6
SUBJECT MECHANICAL DATA FOR E.I.R.	CHECKED BY	DATE	SHEET NO. 1 OF 7

1. FOR COMPARATIVE DATA SEE ELECTRICAL DATA SHEET 1 OF 1
2. ESTIMATED ENERGY INPUT FOR FUEL OIL

a) AVERAGE FUEL OIL IN BTU PER SQ FT PER DAY

CAL 1ST BANK	CORR. FACTOR AREA	CORR. FACTOR GAS TO OIL	CORR. FACTOR TITLE 24	TOTAL FOR HINES
--------------	-------------------	-------------------------	-----------------------	-----------------

$$100 \times 1.11 \times 1.11 \times 0.90 = 111$$

b) MAXIMUM PEAK FUEL OIL CONSUMPTION, BTU (MILLIONS)

CAL 1ST BANK	CORR. FACTOR AREA	CORR. FACTOR GAS TO OIL	CORR. FACTOR TITLE 24
--------------	-------------------	-------------------------	-----------------------

$$6.5 \times 1.11 \times 1.11 \times 0.90 = 7.2$$

c) AVERAGE DAILY FUEL OIL CONSUMPTION, BTU (MILLIONS)

CAL 1ST BANK	CORR. FACTOR AREA	CORR. FACTOR GAS TO OIL	CORR. FACTOR TITLE 24
--------------	-------------------	-------------------------	-----------------------

$$33 \times 1.11 \times 1.11 \times 0.90 = 36.6$$

d) AVERAGE ANNUAL FUEL OIL CONSUMPTION, BTU (BILLIONS)

CAL 1ST BANK	CORR. FACTOR AREA	CORR. FACTOR GAS TO OIL	CORR. FACTOR TITLE 24
--------------	-------------------	-------------------------	-----------------------

$$12 \times 1.11 \times 1.11 \times 0.90 = 13.2$$

SKIDMORE, OWINGS & MERRILL  
ARCHITECTS - ENGINEERS

## ENGINEERING DEPARTMENT CALCULATIONS

BUILDING	PROPOSED HINES OFF. BLDG S,F.	MADE BY	HJM	DATE	15 JUL 76	JOB NO	11437-1
SUBJECT	MECHANICAL DATA FOR EIR	CHECKED BY		DATE		SHEET NO.	2 OF

e) ENERGY REDUCTION FOR SUPPLY FANS - TITLE 24 HP

CAL 1ST BANK	CORR. FACTOR	CORR. FACTOR	TOTAL
AREA		TITLE 24	HP
400	X 1.27	0.80	406

DELETE

**SKIDMORE, OWINGS & MERRILL**  
ARCHITECTS - ENGINEERS

ENGINEERING DEPARTMENT CALCULATIONS

BUILDING PROPOSED HINES OFFICE BLDG., S.F.	MADE BY EPLEE DATE 7/15/76	JOB NO. 11457-00X
SUBJECT ELECTRICAL DATA FOR E.I.R.	CHECKED BY J.S. DATE 7/15/76	SHEET NO. 1 OF 1

A. COMPARATIVE DATA:

	PROPOSED HINES BUILDING	CALIF. 1ST BANK	CORRECTIVE FACTOR
1. GROSS AREA:	386,100 S.F.	348,127 S.F.	+ 11%
2. NET RENT. AREA:	349,516 S.F.	247,441 S.F.	+ 27%
3. GROSS AREA PER FLOOR:	13,440 S.F.	15,485 S.F.	-
4. NO. OF TYP. FLOORS:	28	20	

B. ESTIMATED ELECTRICAL CONNECTED LOAD:

$$\text{CAL. 1ST BANK} \quad \text{CORRECTIVE} \quad \text{ADJUST FOR TITLE 24} \quad \text{TOTAL FOR HINE}$$

a) LIGHTING:  $1500 \text{ KW} \times 1.27\% \times 0.90\% = 1,710 \text{ KW}$

b) OTHER LOAD:  $3000 \text{ KW} \times 1.27\% = 3,800 \text{ KW}$  (FOR EQUIP., ETC.)

c) TABULATION:  $(1710 \text{ KW}) + (3800 \text{ KW}) = 5,510 \text{ KW}$  TOTAL FOR HINES

d) ALLOWANCE FOR TITLE 24 ON MECHANICAL EQUIPMENT LOAD REDUCTION:  
 $100 \text{ H.P.} \times 127\% = 127 \text{ H.P.} = 127 \text{ KW}$

$\therefore 5,510 \text{ KW} - 127 \text{ KW} = 5,383 \text{ KW}$ ; SAY 5,400 KW GRAND TOTAL

6. ESTIMATED AVERAGE KWH USED PER MONTH: BASED ON 5.2 KWH/SQ.FT. \*

a) APPROXIMATED FROM DAILY DEMAND CURVE CHART FOR 24 HRS. = 24,300 KWH

b) DAILY 24,300 KWH X 25 DAYS/MONTH = 620,000 KWH / Month

7. ESTIMATED AVERAGE KWH USED PER YEAR:  $620,000 \text{ KWH} \times 12 = 7,440,000 \text{ KWH}$

8. ESTIMATED AVERAGE KWH USED PER MONTH PER SQ.FT.:  $620,000 \text{ KWH} \div 200 \text{ KWH} = 11 \text{ KWH}$

METER READINGS OF SEVERAL EXISTING LOCAL OFFICE BUILDINGS ADJUSTED FOR USE IN THIS PROJECT.

\* DATA DERIVED FROM ACTUAL P.G. & E. CO. METER READINGS OF SEVERAL EXISTING LOCAL OFFICE BUILDINGS ADJUSTED FOR USE IN THIS PROJECT.

TABLE

ELECTRICAL ENERGY REQUIREMENTS  
(383,000 square foot gross)

	Diversity Factor	Average Demand (KWH)
Ceiling lighting-27,520 watts/floor/hr.		
(actual typical layout) x 31 floors	853.12	100% 853.12
Wall Plugs-15,300 watts/floor/hr.		
(actual typical floor layout) x 31	474.30	36% <u>173.88</u>
Total lighting		1027.00
<u>1,027,000</u> <u>383,000 sq. ft.</u> = 2.68 watts/hr. per sq. ft. gross 2.68/.84 = 3.19 watts/hr. per sq. ft. net rentable		
(Within Title 24 requirements)		
Elevators - * 5 motors @ 28 HP ea. = 147.2 * 5 motors @ 42 HP ea. = 203.0 * 1 motor @ 20 HP = 19.9 * 1 motor @ 15 HP = 15.9	386.0 KW	* 30% 115.80 KW
* data from Otis Elevator Co.		
Plumbing pumps		
4 motors @ 15 HP ea. = 79.6 2 motors @ 7.5 ea. = 16.7	96.3 KW	50% <u>46.60 KW</u>
(Lincoln Motor ratings)		
Total utility		162.40 KW
HVAC System		
2 chillers		201.0 KW
2 condenser water pumps		48.3
2 tower fans		38.2
2 chilled water pumps		68.1
2 hot water pumps		11.5
15 air handlers		188.0
72 fan-coils		27.1
Miscellaneous		5.8
2 air compressors		5.6
4 exhaust fans		16.1
Total HVAC electrical use		610.0 KW
Grand Total	average KWH	1799.4

BUILDING ENERGY SYSTEMS AND ECONOMIC ANALYSIS  
BY  
INDICATED DESIGN VALUES ALTERNATIVE 1

PAGE (2)  
06/20/77  
15 V (200)

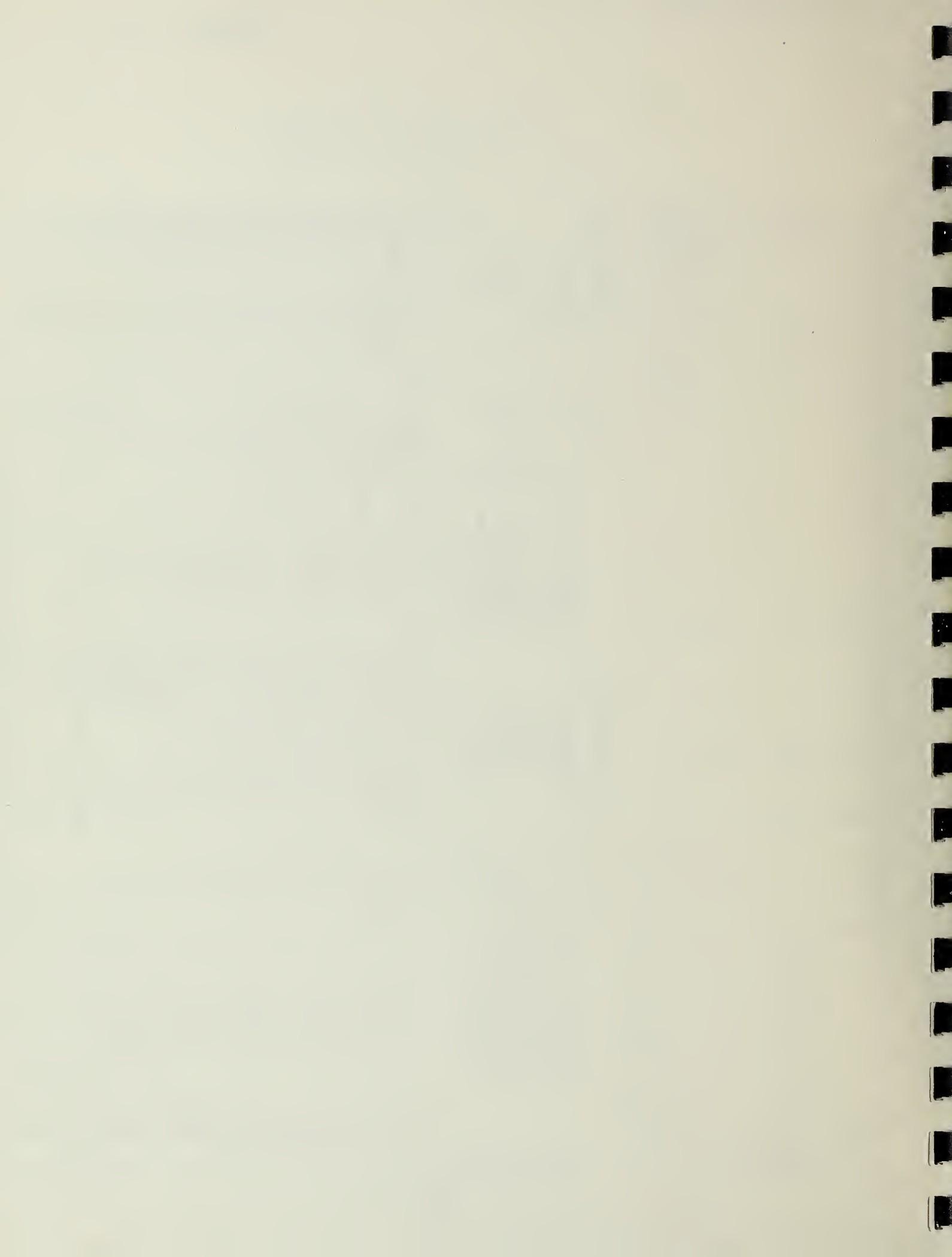
SYSTEM 2 (skin load)

	DESIGN CFM - TOTAL								
DESIGN CFM - OUTSIDE AIR	0	0	0	0	0	0	0	0	0
DESIGN COOLING TONS	0	0	0	0	0	0	0	0	0
DESIGN SUPPLY AIR DRY BULB	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9
DESIGN HEATING MBH	4255.41	4255.41	4255.41	4255.41	4255.41	4255.41	4255.41	4255.41	4255.41

SYSTEM 1 (total load)

	DESIGN CFM - TOTAL								
DESIGN CFM - OUTSIDE AIR	0	0	0	0	0	0	0	0	0
DESIGN COOLING TONS	0	0	0	0	0	0	0	0	0
DESIGN SUPPLY AIR DRY BULB	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9	60.9
DESIGN HEATING MBH	4771.24	4771.24	4771.24	4771.24	4771.24	4771.24	4771.24	4771.24	4771.24

MONTH	MUNICIPAL ENERGY CONSUMPTION									
	ELEC KWH	GAS THERMS	STEAM THERMS	WATER 1000 GAL	WATER THERMS	CHWTH THERMS	CHWTH KWH	ELEC DEMAND KWH	ELEC DEMAND KWH	TOTAL SUPPLY MBTU
JAN	398941.	0.	0.	5761.	91.	0.	0.	1031.	0.	212790.1
FEB	393196.	0.	0.	4422.	161.	0.	0.	1430.	0.	860100
MAR	455176.	0.	0.	4844.	181.	0.	0.	1000.	0.	560000
APR	401580.	0.	0.	3553.	195.	0.	0.	1091.	0.	2153.
MAY	446654.	0.	0.	3479.	236.	0.	0.	2198.	0.	21980.
JUNE	496023.	0.	0.	1642.	410.	0.	0.	2101.	0.	21010.
JULY	406242.	0.	0.	1096.	513.	0.	0.	2153.	0.	21530.
AUG	549103.	0.	0.	1062.	669.	0.	0.	2160.	0.	21600.
SEPT	458101.	0.	0.	1522.	262.	0.	0.	2162.	0.	21620.
OCT	502230.	0.	0.	1111.	492.	0.	0.	2163.	0.	21630.
NOV	413692.	0.	0.	4564.	126.	0.	0.	2164.	0.	21640.
DEC	396314.	0.	0.	4545.	0.	0.	0.	2165.	0.	21650.
TOTAL	5378346.	0.	0.	38202.	0.	0.	0.	2166.	0.	216600.
ENERGY CONSUMPTION	57401.	0.	0.	201100.	1001.	0.	0.	2167.	0.	216700.
TOTAL SUMMER PUUIATE	0.	0.	0.	0.	0.	0.	0.	2168.	0.	216800.
TOTAL WINTER PUUIATE	0.	0.	0.	0.	0.	0.	0.	2169.	0.	216900.







## **APPENDICES**



## APPENDIX A

### BIBLIOGRAPHY

- Arthur D. Little, Inc. Commercial and Industrial Activities in San Francisco: Present Characteristics and Future Trends. Report to San Francisco Department of City Planning, June 1975.
- Bay Area Air Pollution Control District. Guidelines for Air Quality Impact Analysis, 1975.
- 
- Source Inventory of Air Pollutant Emissions in The San Francisco Bay Area, 1973.
- Blume, John and Associates. San Francisco Seismic Investigation. Prepared for the San Francisco Department of City Planning, June 1974.
- California Department of Natural Resources, Division of Mines and Geology. Urban Geology Master Plan for California. Open File Report 72-74, December 1971.
- Canter, Donald. Skyscraper Boom is Slowing Down, San Francisco Examiner business page, June 9, 1976.
- Federal Highway Administration. Federal Highway Program Manual, Vol. 7, Chap. 7, Washington, D.C., May 14, 1976.
- Fruin, John J. Pedestrian Planning and Design. Metropolitan Association of Urban Designers and Environmental Planners, Inc., 1971.
- McGulien, Bill (Grubb and Ellis Commercial Brokerage Co.). Recent Trends in High Rise Office Space Construction and Absorption San Francisco Central Financial District, undated.
- National Academy of Sciences-National Research Council. Division of Engineering and Industrial Research. Highway Research Board. Highway Capacity Manual (Special Report 87). Washington, D.C., 1965, Chapter 6.
- San Francisco, City and County of. San Francisco Noise Abatement and Control Ordinance No. 274-72, Section 2907 Construction Equipment, December 4, 1972.
- 
- Department of City Planning. Commercial Trends: Report Containing Background Information for the Commerce and Industrial Element of the Comprehensive Plan of San Francisco, July 1975.

San Francisco. Community Safety Element: The Comprehensive Plan of San Francisco (A Proposal for Citizen Review), July 1974, page 43.

\_\_\_\_\_  
Draft Environmental Impact Report, 595 Market Street, (E.E. 74.322) December 1975.

\_\_\_\_\_  
Final Environmental Impact Report, Bank of Tokyo of California Building (E.E. 74.170). February 27, 1975.

\_\_\_\_\_  
Labor Force Trends: Report Containing Background Information for the Commerce and Industry Element of the San Francisco Comprehensive Plan, June 1975.

\_\_\_\_\_  
Transportation Element of the San Francisco Master Plan, April 22, 1972.

\_\_\_\_\_  
Police Department. Environmental Impact Report-Evaluation of Police Services for Arthur D. Little, Inc., July 1976.

San Francisco Planning and Urban Renewal Association. Impact of Intensive High Rise Development on San Francisco. San Francisco, 1975.

\_\_\_\_\_  
Unpublished data developed for the study "Impact of Intensive High Rise Development on San Francisco," provided by Keyser-Marston and Associates of San Francisco, 1975.

Trask, P.D. and Rolsten, J.W., "Engineering Geology of San Francisco Bay." Geological Society of America Bulletin, V.62, No. 9, P. 1085, 1951.

APPENDIX B  
TABLE 13  
FLOOR AREA RATIO AND BONUS AREA CALCULATIONS

Floor Area Ratio (FAR) Calculations:

The site has a FAR of 14:1, therefore:

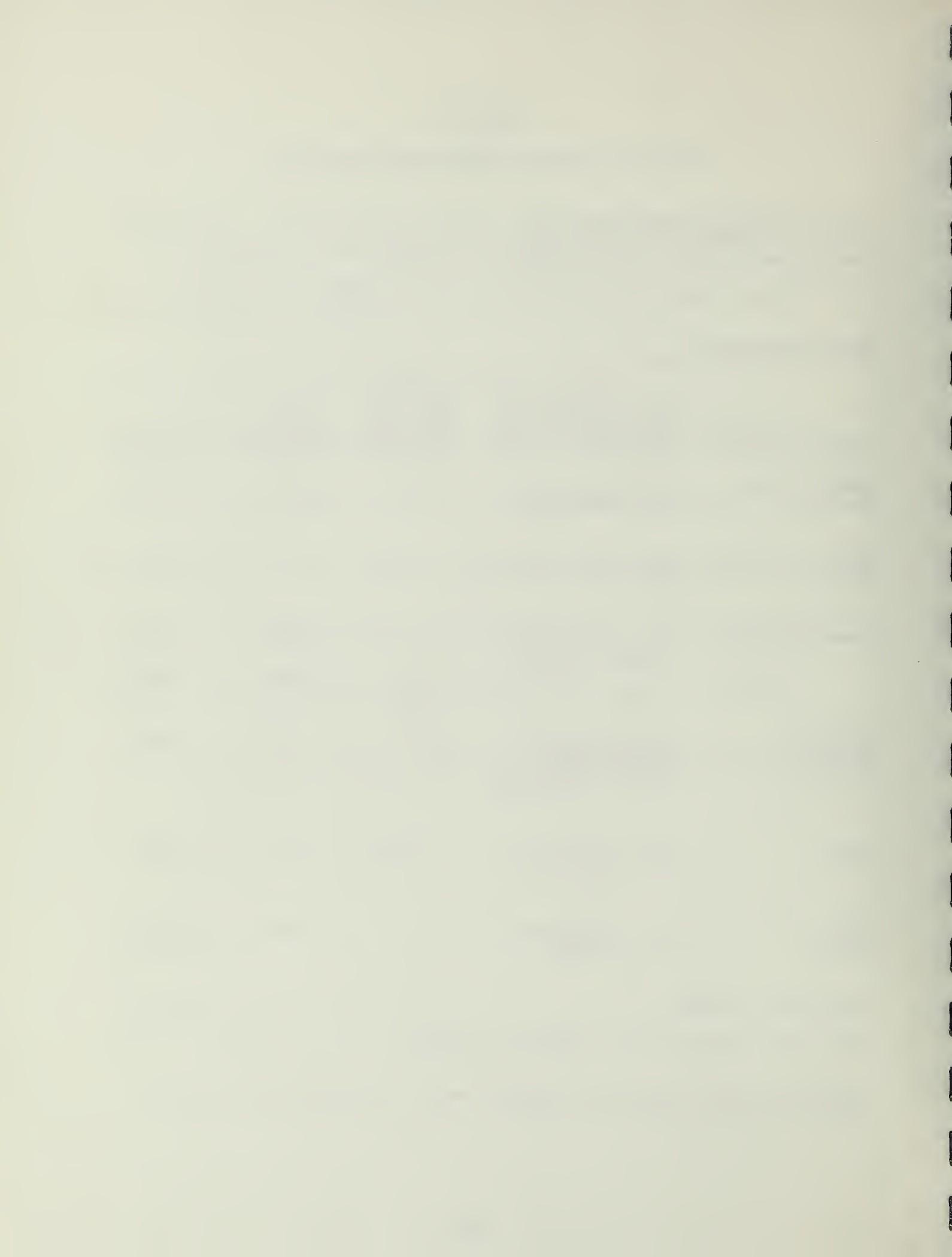
$$18,579 \text{ sq. ft. site area} \times 14 = 260,100 \text{ sq. ft. Allowable Floor Area}$$

Bonus Calculations:

<u>Building Feature</u>	<u>Unit of Feature of Which Bonus is Based and Number of Units</u>	<u>Sq. Ft. of Bonus Area per Unit of Feature</u>	<u>Number of Units of Feature</u>	<u>Square Feet of Bonus</u>
Rapid Transit Proximity	Distance less than 750' from station	50	210'	10,500
Multiple Building Entry	Each major entrance after first	5% FAR	1	13,005
Sidewalk Widening	Each creditable foot sidewalk widening	7	4648	32,535
		3	2160	6,980
Shortened Walking Distance	Each foot by which walking distance between streets and alleys is shortened	40	36	1,440
Plaza	Each creditable sq. ft. of plaza area	15% FAR	5573	39,015
Side Setback	Each creditable sq. ft. of setback	6	3837	23,025
Total Bonus Allowance				126,000

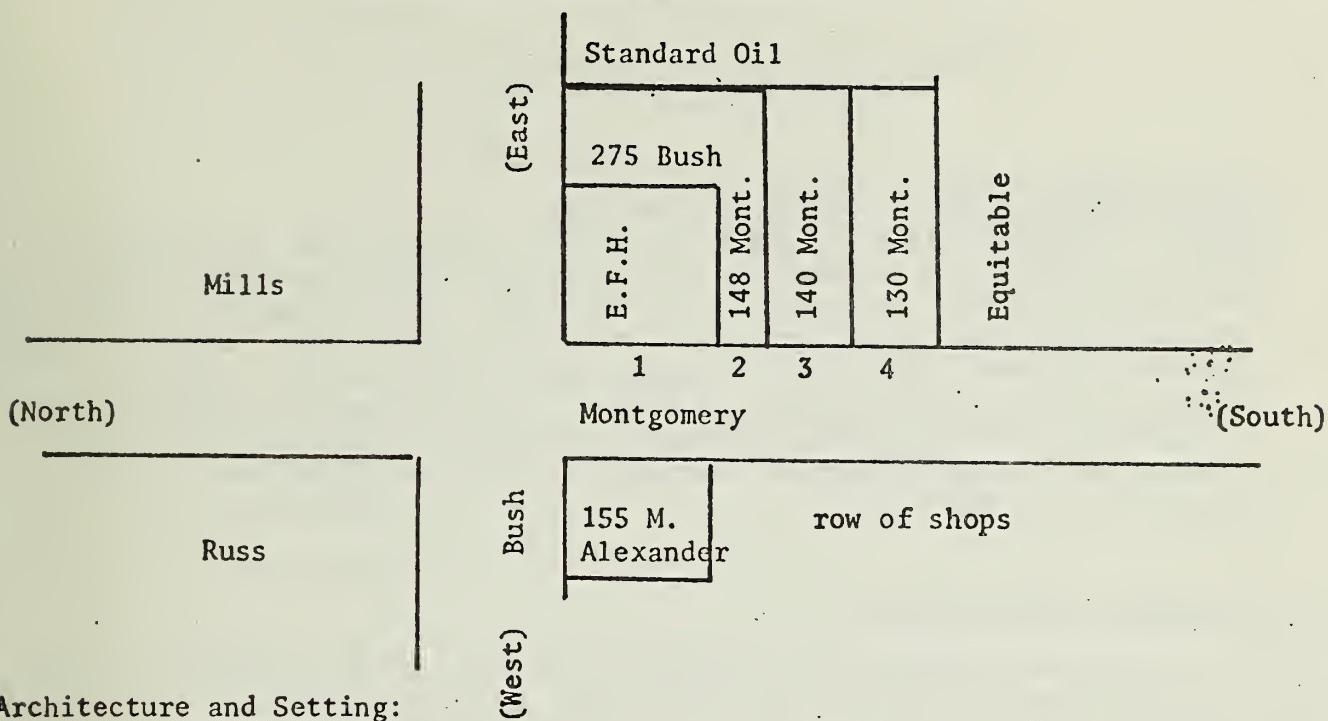
TOTAL FAR + BONUS ALLOWANCE: 386,100 square feet

\*Approval of bonus for plaza is uncertain as of 30 March 1977 due to design and microclimate constraints to use.



Report on the Montgomery/Bush Intersection

June 28, 1976

Architecture and Setting:

The most important architectural feature of this important intersection is the buff color of the brick and terra cotta clad Mills, Russ and Alexander Buildings. The Mills and Russ Buildings are premier landmarks in the Financial District. It is especially important that the venerable Mills Building not be overwhelmed by an unsympathetic neighbor. (This does not mean that a parody of the Mills is called for.)

Another very important neighbor is the old Standard Oil Building on Bush, a light gray, handsomely detailed office building.

The group of low buildings on the southeast corner of Montgomery and Bush is of uneven height and allows a good view of the Standard Oil Building from Montgomery. The group embodies the scale and style of post-1906 Montgomery Street

## 1. 160 Montgomery (E.F. Hutton Building)

This is a 4 story, white, neo-classical, cube-shaped reinforced concrete building typical of San Francisco's bank and brokerage buildings. The Montgomery Street elevation is distinguished by four, 2 story high engaged classical columns with three arches between them. The Bush Street elevation has five pilasters and four arches. The building is a very good example of low rise classical buildings of the type that once dominated Montgomery Street. An important building with high visibility.

## 2. 148 Montgomery/275 Bush (Title Insurance)

This is a five story, red brick clad neo-Georgian building with white trim. A pair of white columns flank both the Montgomery and Bush Street entrances. This L-shaped building has five stories on Bush Street and what appears to be one story on Montgomery. Not a particularly handsome building.

## 3. 140 Montgomery (Gibraltar Savings)

An indifferent building with a concrete grillework screen on its front.

4. 130 Montgomery (French Bank of California)

This is a narrow, six story stone faced (?) building in the art deco style. The building has fine ornamentation and a very nicely carried out design that works well with the buildings narrow shape. The entrance is dramatically treated and flanked by bas reliefs of muscular figures. The copper (bronze?) spandrels are very beautifully designed with zig zag motifs. Its color harmonizes with its neighbor to the south. There are very few buildings in this style in San Francisco, and this is one of the finest. An important architectural embellishment to downtown. Whatever is built next to it should try to respect it.

Urban Context and Street Life:

One of the most welcome features of Montgomery Street is the surprising variety of shops and services on the sidewalk level of (especially) the older buildings. Bars, eating places, clothes stores and many other small businesses make the street a lively and rewarding place to walk. This is increasingly rare in American financial districts where bank branches and airline ticket offices have effectively sterilized such prime streets. The large new high rises that have appeared along Montgomery recently have tended to turn their expensive street levels over to bank branches and similar monotonous uses. This problem got so bad in mid-Manhattan that planning policies have had to be instituted to try to overcome it. San Francisco's Financial District has escaped this blight--so far. Across the street from the group of low buildings under examination is a particularly interesting row of shops anchored by the Magnin's at 155 Montgomery. A surprising number of small stores survive here. This could be expanded across the street. The Equitable Building, with a bank on the corner, is a sufficient warning of what not to do.

Randolph Delehanty  
June 28, 1976

## APPENDIX D

## TRANSPORTATION

TABLE 14

ON-STREET PARKING AND PARKING ZONE CONDITIONS  
VICINITY OF BUSH AND MONTGOMERY

<u>Street</u>	<u>Parking Meters</u>		<u>Truck Loading</u>	<u>Special Truck</u>	<u>White</u>
	<u>Reg.</u>	<u>Yellow</u>	<u>Zones*</u> (feet)	<u>Loading Zone*</u> (feet)	<u>Zones*</u> (feet)
N-North Side					
S-South Side					
<u>California</u>					
N-Grant-Kearny					
S- " "					
N-Kearny-Montgomery					
S- " "					
N-Montgomery-Sansome					
S- " "				177,110,18	43
N-Sansome-Battery					
S- " "	2	4	38	84	
<u>Pine</u>					
N-Grant-Kearny		12			
S- " "	7	2	57		
N-Kearny-Montgomery			2	66	44,109,53
S- " "					
N-Montgomery-Sansome	2	6	60,30,44	48	
S- " "					
N-Sansome-Battery		7	49,30		
S- " "					
<u>Bush</u>					
N-Grant-Kearny	3	2	29,42,34		31
S- " "		7	30,30,38,35		
N-Kearny-Montgomery					
S- " "		7	22	28,21	30
N-Mongomery-Sansome					
S- " "		2	23,41,38		36
N-Sansome-Battery					
S- " "		2	66,62		22
S- " "					44
<u>Sutter</u>					
N-Grant-Kearny	1	5	44		22
S- " "	2	2	114,72		
N-Kearny-Mongomery		4	42,36		
S- " "		5	56,54,20,22		44,22
N-Montgomery-Sansome	3			62	
S- " "	6		37,43,42	110	

TABLE 14 (continued)

ON-STREET PARKING AND PARKING ZONE CONDITIONS  
VICINITY OF BUSH AND MONTGOMERY

	<u>Parking Meters</u>		<u>Truck Loading</u>	<u>Special Truck</u>	<u>White</u>
	<u>Reg.</u>	<u>Yellow</u>	<u>Zones*</u> (feet)	<u>Loading Zone*</u> (feet)	<u>Zones*</u> (feet)
<u>Post</u>					
N-Grant-Kearny	6	3	40		
S- " "	4	5	38,40		
N-Kearny-Montgomery		10	22	110	
S- " "	1		40	60,44	26,47
<u>Geary</u>					
N-Grant-Kearny	3	4	42		
S- " "	4	3	22,75		
<u>Grant</u>					
W-California-Pine					
E- " "					
W-Pine-Bush					
E- " "					
W-Bush-Sutter					
E-Bush-Sutter	3		20,28		64
W-Sutter-Post					
E-Sutter-Post			38-60		22
W-Post-Geary					
E- " "	1	2	51		40
W-Geary-Market					
E- " "	5			88	44
<u>Kearny</u>					
W-California-Pine	5			40	41
E- " "					
W-Pine-Bush		2	110	88	
E- " "					
W-Bush-Sutter		5	75		
E- " "					
W-Sutter-Post		5	18,33	76	
E- " "					
W-Post-Geary				88,88	
E- " "					

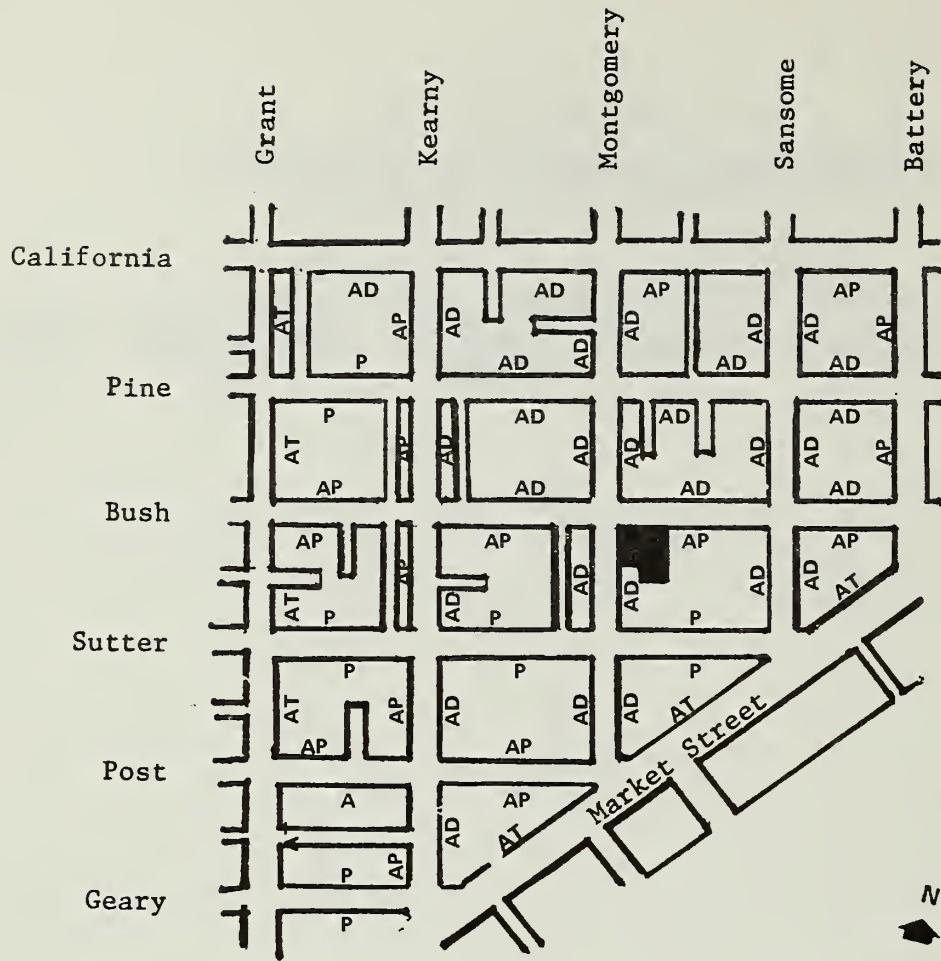
TABLE 14 (continued)

ON-STREET PARKING AND PARKING ZONE CONDITIONS  
VICINITY OF BUSH AND MONTGOMERY

	<u>Parking Meters</u>		<u>Truck Loading</u>	<u>Special Truck</u>	<u>White</u>
	<u>Reg.</u>	<u>Yellow</u>	<u>Zones*</u> (feet)	<u>Loading Zone*</u> (feet)	<u>Zones*</u> (feet)
<u>Montgomery</u>					
W-California-Pine					
E- " "					
W-Pine-Bush					
E- " "					
W-Bush-Sutter					
E " "					
W-Sutter-Post					
E " "					
<u>Sansome</u>					
W-California-Pine					
E- " "					
W-Pine-Bush					
E- " "					
W-Bush-Sutter					
E- " "					
<u>Battery</u>					
W-California-Pine	2		41,40		
E- " "					
W-Pine-Bush			66,77		
E- " "					
W-Bush-Market					
E- " "					
Total	61	107	2,422	1,546	578

Source: City and County of San Francisco, Bureau of Traffic Engineering,  
Parking Meter District Maps.

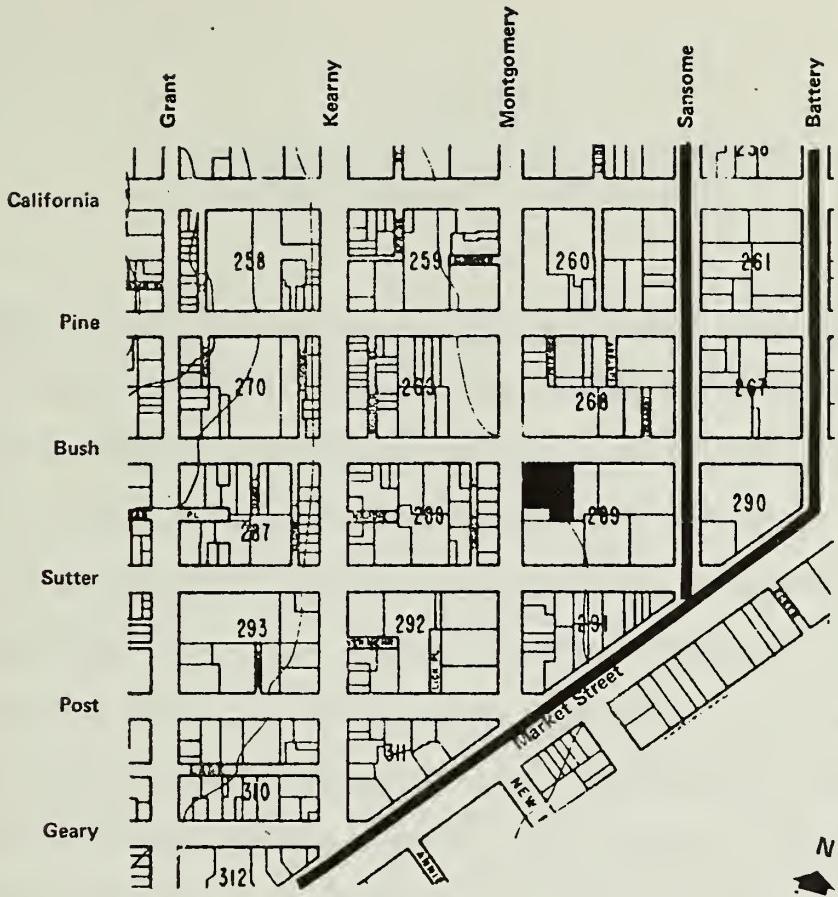
\* Each number corresponds to a separate zone. (i.e., 177, 110, 18 = one zone of 177', one zone of 110', and one of 18'.)



Code	Time	Days
A	7-9 a.m.	Monday-Saturday
P	4-6 p.m.	Monday-Saturday
AP	7-9 a.m. and 4-6 p.m.	Monday-Saturday
AD	7 a.m.-6 p.m.	Monday-Friday
AT	All Times	Every Day

Source: Bureau of Traffic Engineering, City and County of San Francisco.

FIGURE 21 TOW-AWAY ZONES IN THE VICINITY OF MONTGOMERY AND BUSH



Source: San Francisco Master Plan, Transportation Element,  
adopted April 27, 1972.

FIGURE 22      STREETS DESIGNATED AS BICYCLE ROUTES



## APPENDIX E

### AIR QUALITY CALCULATIONS FOR EXISTING CARBON MONOXIDE CONCENTRATIONS

Emissions estimates require three fundamental types of information: the size and character of the vehicular source, the emissions rate of individual vehicles, and the meteorologic process which results in dispersion of emissions away from their point of generation. The data sources and assumptions required to complete the emissions estimates for this study are outlined in the following discussion.

Source strength and character are established by the number of vehicles passing through the air cell in question and by their mode of operation for peak hour calculations. The volume of rush hour traffic on various city streets is measured as a number of vehicles per hour. By comparison to the theoretical capacity of the roadway, the volume of traffic determines the service level or degree of congestion experience. Actual traffic experience varies from day to day, yet the peak hour count is a generally reliable indication of the vehicular volume. The actual congestion, however, is more variable, depending largely upon weather conditions and upon the flow of traffic at origin or destination points fairly distant from the street segment under discussion. The peak hour vehicular loads used in the calculation are shown in Figure 23.

Traffic volume alone does not determine source of strength. The operating mode determines the amount of time the vehicles spend within a specific stretch of roadway, and the engine cycle characteristics that will affect individual vehicle emissions.

	<i>Montgomery</i>		<i>Sansome</i>	
			458	
<i>California</i>		1,004		1,274
			(500)	
			676*	
<i>Pine</i>		1,175		1,208
			643	
984				
<i>Bush</i>	1,209			1,047
1,146				

\*Counts taken at different intersections on different days provide conflicting data. The higher figure was assumed in the calculations.

Source: San Francisco Department of Public Works (Pine-Sansome Intersection)  
Arthur D. Little, Inc., (Bush-Montgomery Intersection).

FIGURE 23 PEAK HOUR VEHICLE COUNTS

The operating mode was assumed in the worst case to be an average route speed of five miles per hour, comprising equal periods of idling and travel at 10 miles per hour which reflect the signalization at all intersections. Minor variations between intersections in signal cycle produce minor changes in emissions calculations which are probably not significant given the overall level of accuracy of this method. Even more significant than the cycle itself is the phasing of successive traffic signals on major traffic flow patterns. The traffic signalization for these calculations was assumed to be 30 seconds stop, 30 seconds go. The worst case assumption leads to an average forward progression between traffic signal intervals of 450 feet--roughly the length of one city block. A more typical operating mode assumes an average route speed of 10 miles per hour, comprising roughly equal periods of idling and traveling at 20 miles per hour. This rate of progression implies that the motorist would transit two to three city blocks on a signal interval if the lights are properly phased.

Vehicular emissions are a complex function of the internal combustion engine technology of various model years combined with deterioration and modified by differences in the operating characteristics of the engine under varying speeds and loads and temperatures. Practically speaking, emissions measurements from actual vehicles based upon laboratory tests simulating steady state travel have been most consistent. At very low speeds, particularly in stop and go traffic, there is more variation between observations of vehicular emissions for nearly all pollutants. Earlier (1973), measurements combined with estimates of emissions control technology for the future implied a dramatic drop in emissions levels for all pollutants in nearly all modes of engine operation. More recently,

the large emissions during idle, particularly of cold engines, have received new emphasis. In addition, many putative technological innovations have been delayed indeterminantly. As a result, auto emissions modeling the low route speed situation at issue here will vary depending on the experimental data base and the calendar year of emissions forecast. The current U. S. Environmental Protection Agency approach has been to stress the empirical nature of auto emissions based on the actual driving cycle observed. Data in the most recent supplement to the publication AP-42<sup>1</sup> focuses on empirical measurement and emphasizes the errors of projection, presenting empirical data for calendar years 1972 and earlier. In some instances, the carbon monoxide empirical emissions level data for low route speed is 4 times greater than earlier projected emissions levels for the same year. Analysis for this study was therefore made on the basis of both EPA 1972 rates and Bay Area Air Pollution Control District (BAAPCD) projected rates.<sup>2</sup>

In the analysis of emissions levels for this pollutant, the individual vehicular emissions levels of both methods are presented for comparison. The actual pollutant concentrations will resemble those calculated with the 1980 year projection as a base to the degree to which new technological improvements in emissions controls become available and are in fact effective in this range of the internal combustion engine cycle. If technological controls are relatively ineffective or substantially delayed, then the pollutant experience may more closely resemble the levels calculated with the 1972 vehicle as a base.

- 
1. U. S. Environmental Protection Agency, Office of Air and Waste Management/Office of Air Quality Planning and Standards, Supplement No. 5 for Compilation of Air Pollutant Emission Factors, Second Edition, Supplement to AP-42, December 1975.
  2. Bay Area Air Pollution Control District, Guidelines for Air Quality Impact Analysis of Projects, June 1975.

The meteorology of pollutant dispersion in cities is complex and relatively little understood by comparison with the mesoscale analysis for vehicular sources in relatively open country. The most obvious urban component -- large buildings and canyon-like streets -- complicate the airflow patterns. The high surface roughness of the urban environment drastically reduces the average wind speed and the mass of air movement at ground level from that which would be experienced in open country, yet the same surface roughness with a highly geometric arrangement of streets results in a large degree of turbulence and vertical mixing of the air mass as well as in amplification of actual air velocities at ground level at certain points.

Two fundamental airflow patterns are at issue. In one pattern, the predominant regional airflow is parallel to the street section under study. In this case, the velocity at street level is usually very close to, and on occasion even in excess of, the nominal wind velocity in open terrain. Pollutants generated within an air cell are carried along the canyon formed by the street cross section without substantial mixing to either side and with only vertical turbulence and dispersion as the factor controlling steady state pollutant concentrations. The opening of streets at every intersection induces substantial turbulence and air exchange. For the purposes of the analysis used in this study, the canyon effect was assumed to be dominant for the length of two city blocks; that is, that over a two-block period or distance very little transverse air mixing would occur and at the end of the two blocks nearly complete transverse air mixing would occur. This limits the amount of polluted air imported into the cell that serves as a background for emissions from those vehicles that actually occupy the cell under study.

When the predominant airflow is perpendicular to the street, the wind velocity at ground level is dramatically attenuated. In this study, a value of 50 percent is assumed, which may be high in absolute value but which in some degree takes into account the increased vertical mixing caused by cross turbulence at roof top and intersection.

Because of the nature of the parallel airflow and pollutant importation, that situation represents the greatest potential for concentration of pollutants. This cannot be construed as a worst case, however, because nearly every airflow pattern will result in parallel airflow on at least some city streets due to the rigid geometricity of urban planning in the past. Vertical dispersion in the parallel airflow situation is difficult to estimate in the urban case. In the open, with studies of depressed highway sections, the vertical mixing resulting from thermal air currents has been found to play a significant role.

The degree of thermal mixing is indicated by air stability classes, designated by the letters A through F or occasionally beyond. The proximate letters represent unstable air conditions where warm surface air will rise continuously and induce substantial vertical mixing. The distal letters (E or F) indicate stable thermal air regimes, which result in very little mixing and produce the inversion layer phenomenon. Although this effect of air stability undoubtedly acts in urban environments, it is quite likely that the high surface roughness and urban heat island effect will largely offset this phenomenon. Furthermore, the difference in equations represented by the typical and worst case stability classes is relatively small, approximately 10 percent, such that it appears not to be a dominant

environmental parameter. Nonetheless, the worst case is assumed to be air stability Class F, while the typical case for the Bay Area is stability Class D.

Comparing airflow patterns parallel and perpendicular to the street system, there is approximately a threefold difference in ground level concentration. Parallel airflow represents the worst case even though wind velocity attenuation is assumed to be 50 percent for the perpendicular airflow. Airflow patterns that produce winds roughly at  $45^{\circ}$  angles to the street grid produce results roughly intermediate between the two extreme cases.

Since it is problematic as to the actual direction of airflow in combination with other environmental conditions that constitute the typical case, the presentation of ground cell concentration is given as a range. The higher figure represents an instance where the wind would be parallel to the street under designation and the lower figure represents the situation where the predominant airflow is perpendicular to the street under study. Since there is a statistically significant preponderance of westerly wind patterns, it is most likely that east-west streets would experience the higher concentrations while north-south streets would receive the benefits of vertical air mixing induced by perpendicular airflow. This tendency has not been included on a statistical basis within the calculations presented here.

The results of calculations based on the preceding assumptions are presented on a series of street maps, Figures 24 through 27. By comparison with the state and federal ambient air quality standards for one-hour averaging times of carbon monoxide exposure, it may be seen that several

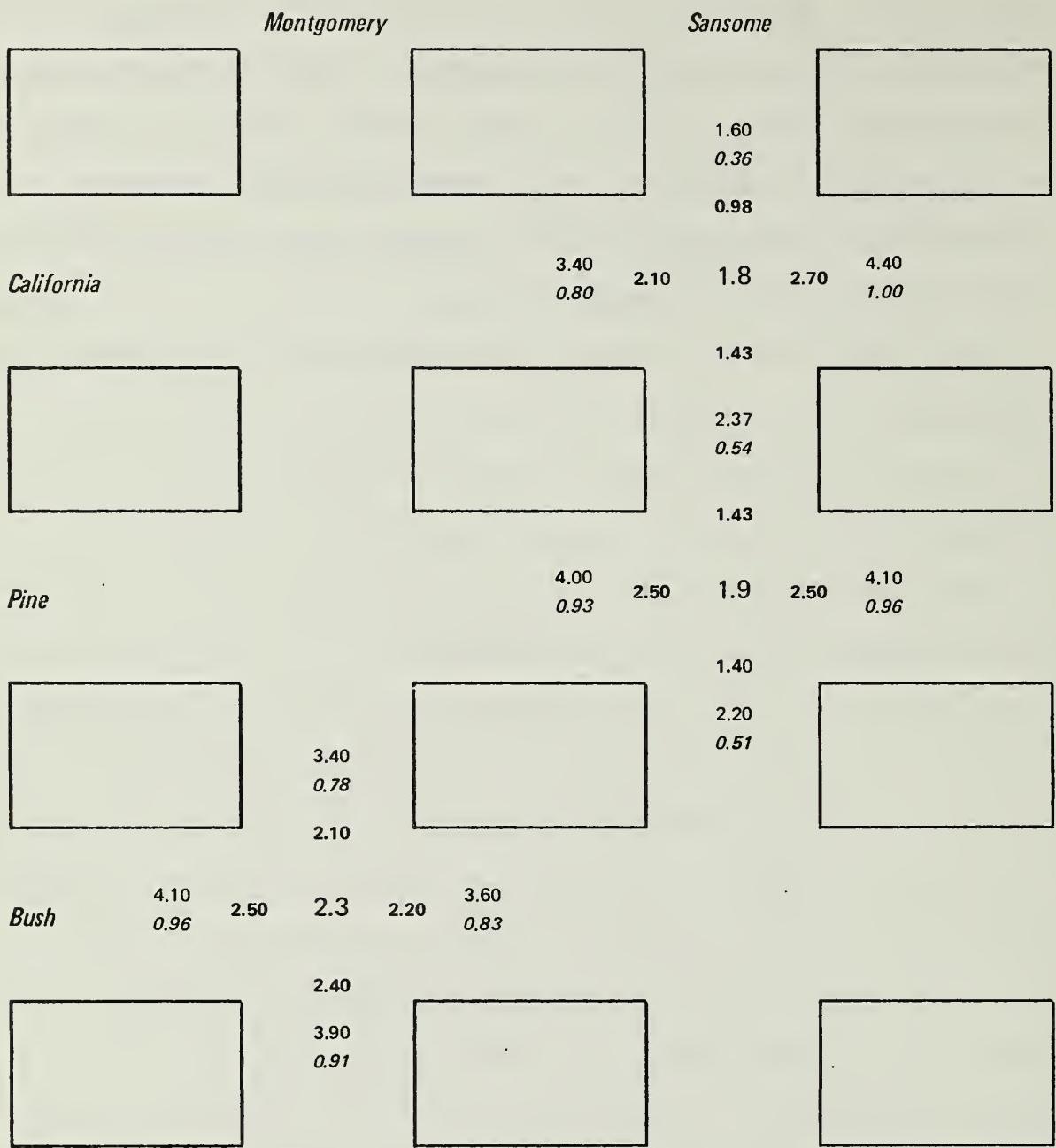
street segments produce unacceptable levels of carbon monoxide with parallel wind flows in the worst case condition, assuming that emission levels for individual vehicles follow the empirical data recently presented by the EPA. Conversely, consideration of emissions projections based on 1980 technological improvements results in far lower carbon monoxide levels and no violation of the ambient air quality standards for this pollutant over a one-hour period.

The complexity of the urban situation combined with the necessarily elaborate algebraic combination of rather variable parameters leads to a substantial degree of variance in the estimates of actual carbon monoxide experience. Actual carbon monoxide levels under most circumstances are expected to be lower due to the greater role of turbulence induced by surface roughness than has been taken into account in the model used. There are, however, meteorologic conditions which closely mimic the worse case such that it does represent a realistic albeit conservative estimate of pollutant conditions that may be experienced on the order of several days per year.

Vehicular pollutants are emitted approximately one foot from the ground by the tailpipes of the individual vehicles. Normally, due to the motion of the vehicles themselves, exhaust gasses are rapidly mixed in a cell approximately twice the height of the vehicles and extending approximately one vehicle lane width on either side of the actual traffic area. This zone constitutes "the ground mixing cell" and represents the volume of air into which the vehicular emissions are immediately diluted and which will then be subject to subsequent dispersion by meteorologic factors. In the urban situation the mixing cell is not strictly comparable to that of the open terrain. First of all, the route speed is so low that turbulence and rapid mixings are problematic in

many instances. On the other hand, the street width is roughly that defined under normal vehicular emissions theory and the averaging time of one hour for carbon monoxide standards integrates over the large degree of variation that will occur during intervals of traffic signalization when a corridor of idling vehicles produce pollutants that receive little dispersion within the mixing cell until vehicular motion resumes.

The basic equations, factors, and emissions rates used in this analysis follow:



**Key:**

The numbers represent one-hour average carbon monoxide concentrations in milligrams per cubic meter:

With the wind parallel to the street

With the wind perpendicular to the street

For each street, average of the parallel and perpendicular winds

For the intersection, average of the four street segments

Note: CO emissions rate: 36.0 g/mi

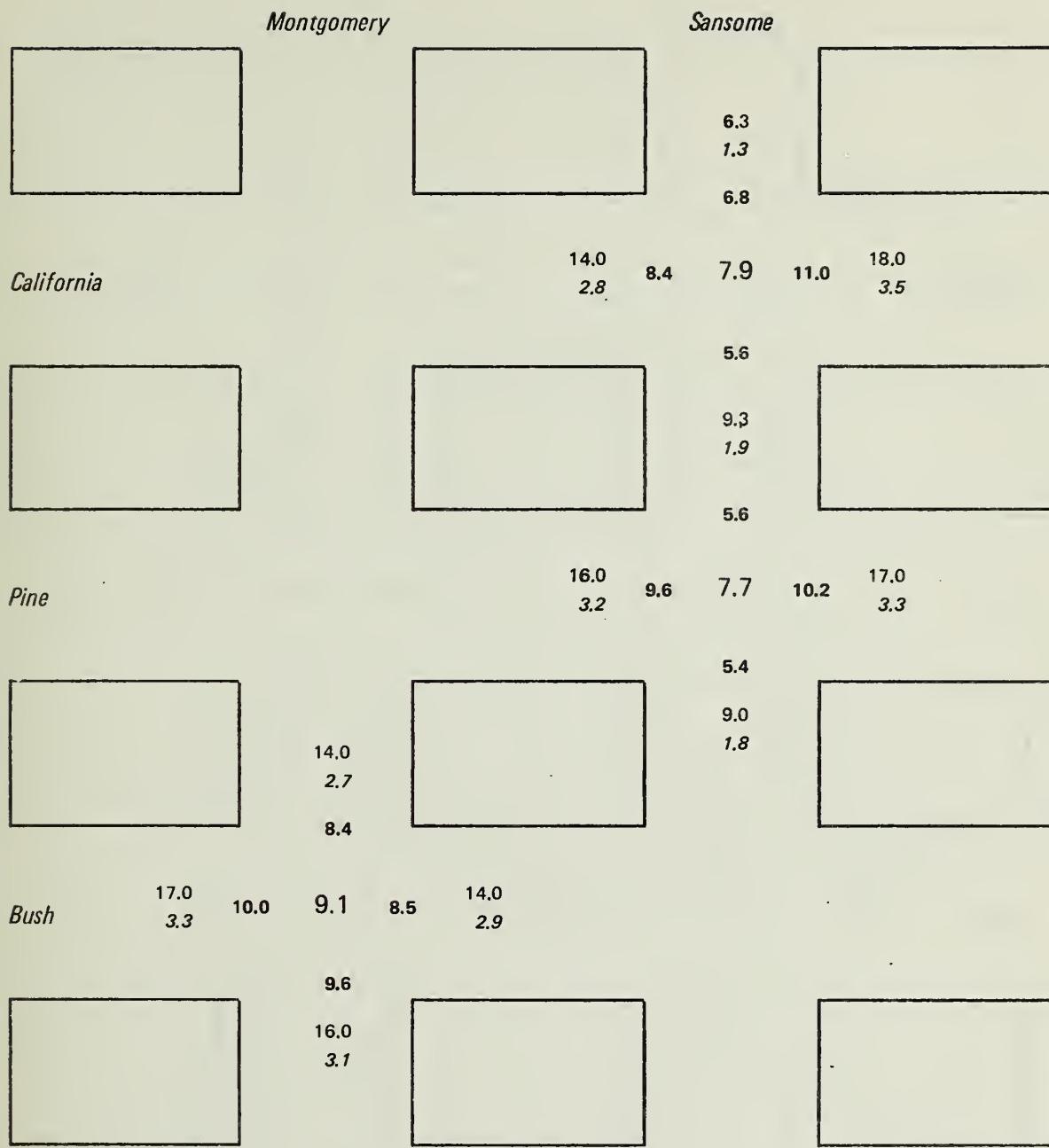
M Factor: {Perpendicular 0.022 ↔ Parallel 0.095}

\*Ambient Air Quality Standards for maximum one-hour concentration of carbon monoxide:

Federal - 40 mg/m<sup>3</sup> (35 ppm)

California - 46 mg/m<sup>3</sup> (40 ppm)

FIGURE 24 CARBON MONOXIDE CONCENTRATIONS  
ASSUMING BAAPCD 1980 EMISSIONS FACTORS AND  
TYPICAL CASE AIR STABILITY CONDITIONS



**Key:**

The numbers represent one-hour average carbon monoxide concentrations in milligrams per cubic meter:

With the wind parallel to the street

With the wind perpendicular to the street

For each street, average of the parallel and perpendicular winds

For the intersection, average of the four street segments

Note: CO emissions rate: 63.6 g/mi

M Factor: { Perpendicular 0.043 ↔ Parallel 0.216 }

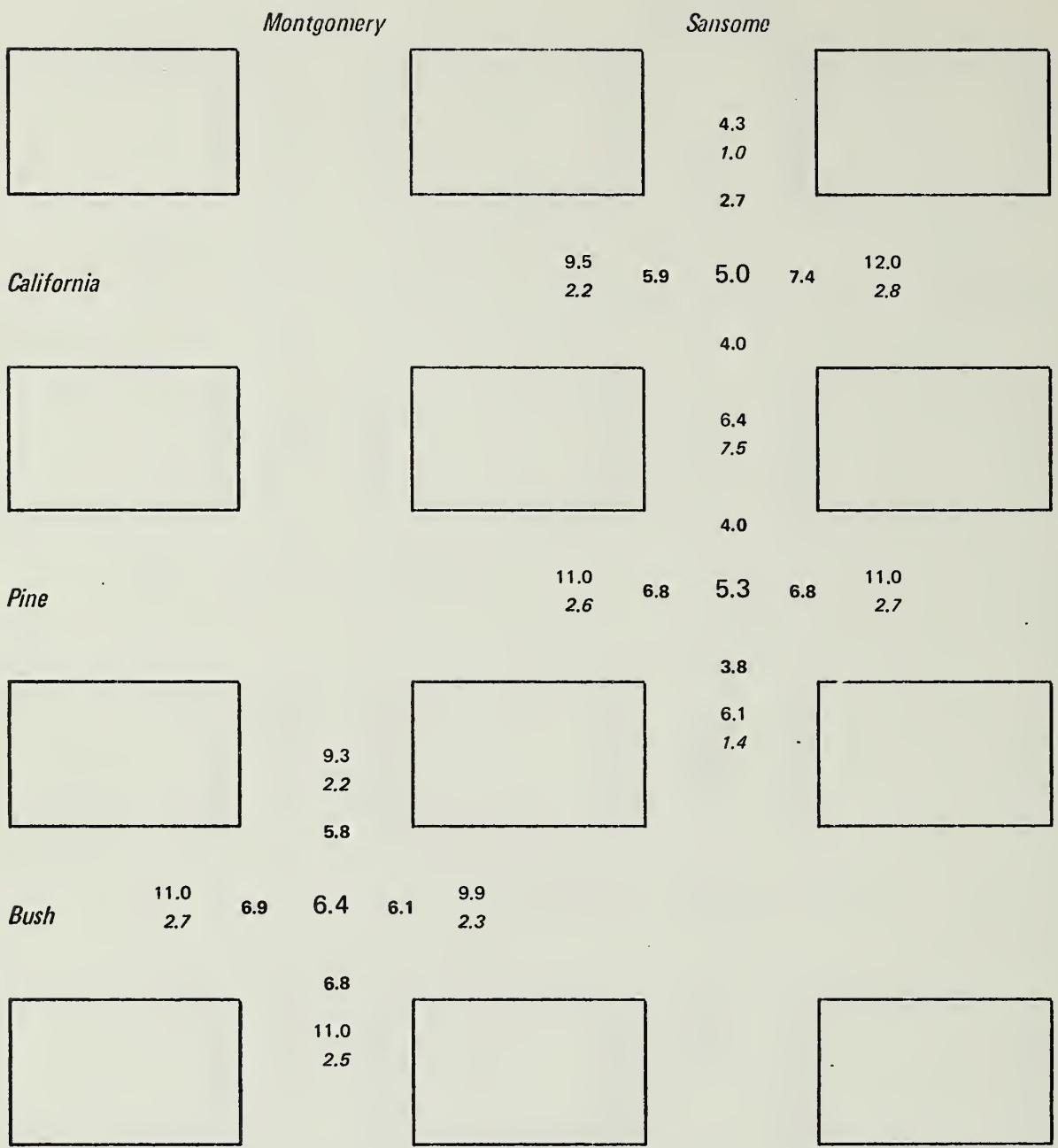
\*Ambient Air Quality Standards for maximum one-hour concentration of carbon monoxide:

Federal — 40 mg/m<sup>3</sup> (35 ppm)

California — 46 mg/m<sup>3</sup> (40 ppm)

FIGURE 25

CARBON MONOXIDE CONCENTRATIONS  
ASSUMING RAAPCD 1980 EMISSIONS FACTORS AND  
WORST CASE AIR STABILITY CONDITIONS



**Key:**

The numbers represent one-hour average carbon monoxide concentrations in milligrams per cubic meter:

With the wind parallel to the street

With the wind perpendicular to the street

For each street, average of the parallel and perpendicular winds

For the intersection, average of the four street segments

Note: CO emissions rate: 213.6 g/mi

M Factor: {Perpendicular 0.022 ↔ Parallel 0.095}

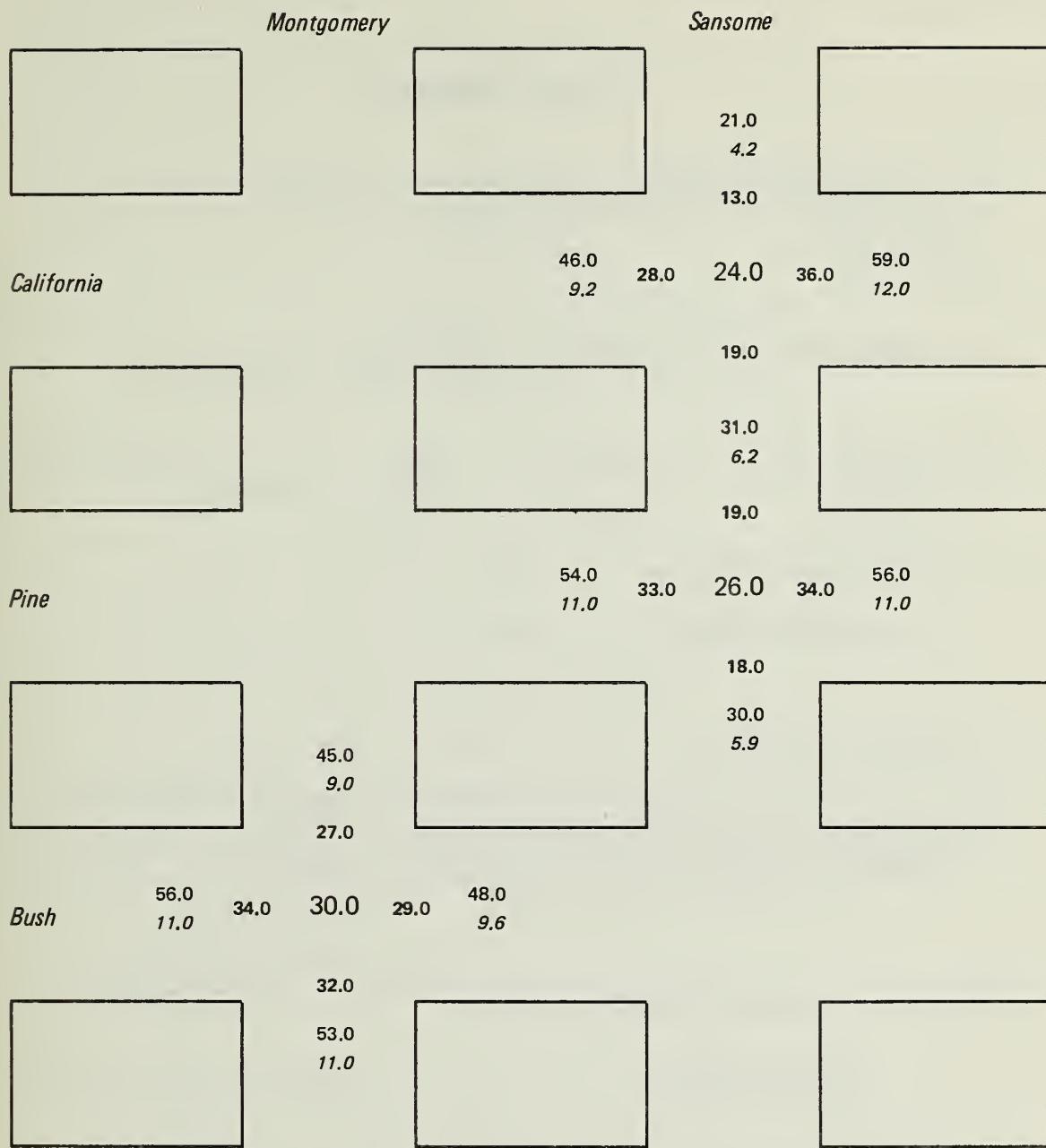
\*Ambient Air Quality Standards for maximum one-hour concentration of carbon monoxide:

Federal - 40 mg/m<sup>3</sup> (35 ppm)

California - 46 mg/m<sup>3</sup> (40 ppm)

FIGURE 26

CARBON MONOXIDE CONCENTRATIONS  
ASSUMING EPA 1972 EMISSIONS FACTORS AND  
TYPICAL CASE AIR STABILITY CONDITIONS



**Key:**

The numbers represent one-hour average carbon monoxide concentrations in milligrams per cubic meter:

With the wind parallel to the street

With the wind perpendicular to the street

For each street, average of the parallel and perpendicular winds

For the intersection, average of the four street segments

Note: CO emissions rate: 213.6 g/mi

Factor M: Perpendicular 0.043  $\leftrightarrow$  Parallel 0.216

\*Ambient Air Quality Standards for maximum one-hour concentration of carbon monoxide:

Federal — 40 mg/m<sup>3</sup> (35 ppm)

California — 46 mg/m<sup>3</sup> (40 ppm)

FIGURE 27      CARBON MONOXIDE CONCENTRATIONS  
ASSUMING EPA 1972 EMISSIONS FACTORS AND  
WORST CASE AIR STABILITY CONDITIONS

## BASIC EQUATIONS

CO concentration (mg/m<sup>3</sup>) = vehicles/hr. × g/mi. × M'  
 with wind parallel (//) or perpendicular (⊥) to street

Orientation:

$$\text{Meteorologic Factor } M_{\perp} = c/Q = \frac{1.06}{K\bar{U} \sin\phi} \quad \text{perpendicular}$$

$$\text{Meteorologic Factor } M_{//} = c/Q = \frac{AW'}{RUK} \quad \text{parallel}$$

A downwind concentration @ 1000'

air stability class F	0.24
" " "	
D	0.21

$\bar{U}$  average wind speed 2 m/s worse case

4 m/s typical case

R roughness attenuation	1.0	parallel
	0.5	perpendicular

$\frac{W'}{K}$  width correction (empirical) 0.34

$\frac{7.19}{\text{width (meters)}}$	street is 70' or 21 m
--------------------------------------	-----------------------

K empirical constant 4.24

φ angle of wind ⊥ use 90°

## METEOROLOGIC FACTOR

	<u>M'</u> <u>Using g/mi.</u>	<u>Modified M'</u> <u>Using mg/m<sup>3</sup></u>
Worse Case	$M_{//} = 0.041$	0.216
	$M_{\perp} = 0.250$	0.043
Typical Case	$M_{//} = 0.018$	0.095
	$M_{\perp} = 0.125$	0.022

Empirical factor for conversion of g/mi. to mg/m<sup>3</sup>, in accordance with State of California Business and Transportation Agency, Department of Public Works, Division of Highways, Air Quality Manual, Mathematical Approach to Estimating Highway Impact on Air Quality, July, 1972.

For parallel winds = 5.26

For perpendicular winds = 0.173

CARBON MONOXIDE EMISSION FACTORS  
(grams/mile)

As defined by: Bay Area Air Pollution Control District,  
Guidelines for Air Quality Impact Analysis of Projects,  
June, 1975.

1980 CO 16.8 g/mi. @ 20 mph  
(Table 1) 5.6 g/min.

10 mph route speed correction 1.5 25.20 g/mi.  
4.2 g/min.

Motor idling 6.4 g/min.  
(Table 2)

Composite	30/30	@ 5 mph avg.	5.3 g/min.
		worse	63.6 g/mi.
"	"	@ 10 mph avg.	6.0 g/min.
		typical	36.0 g/mi.

As defined by: U.S. Environmental Protection Agency, Office of Air and Waste Management/Office of Air Quality Planning and Standards, Supplement No. 5 for Compilation of Air Pollutant Emission Factors, Second Edition, Supplement to AP-42, December, 1975.

1972 CO	59.7 g/mi. @ 20 mph	19.9 g/mi.
	133.1 g/mi. @ 10 "	22.2 g/min.
	247.8 g/mi. @ 5 "	20.6 g/min.

Motor idling 13.3 g/min.

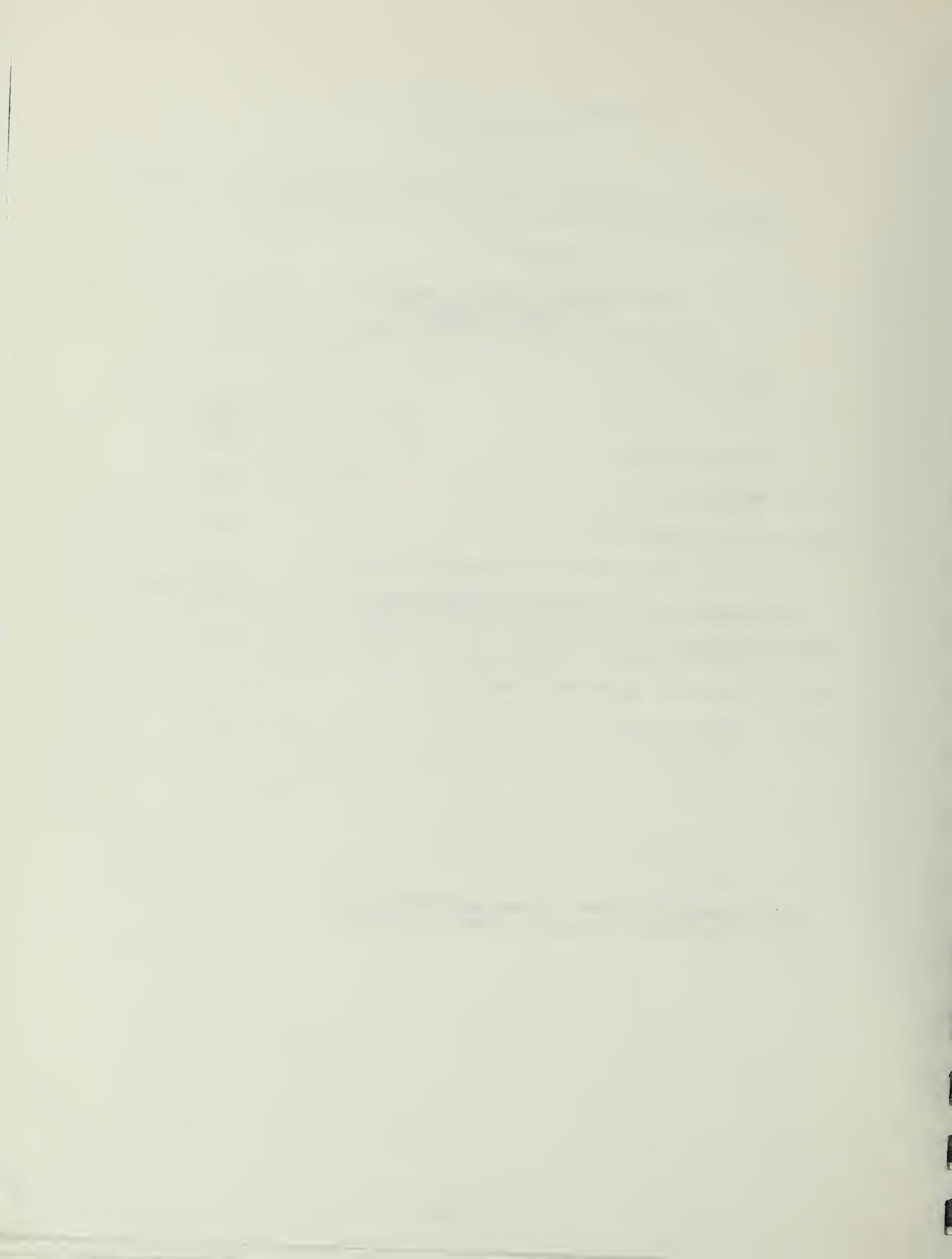
Composite	30/30 @ 5 mph avg.	17.8 g/min.
	worse	213.6 g/mi.
"	" @ 10 mph avg.	16.6 g/min.
	typical	99.6 g/mi.

APPENDIX F

MICROCLIMATE IMPACT ANALYSIS  
FOR THE PROPOSED  
MONTGOMERY-BUSH HIGH-RISE BUILDING

	<u>Page</u>
I. Introduction	137
II. Summary	137
III. Site description	138
IV. Project influence on wind and comfort	138
V. Mitigation of adverse wind effects	146
VI. Methodology	148
VII. Technical data and discussion	149
VIII. Bibliography	165.

Environmental Impact Planning Corporation  
319 11th Street, San Francisco, CA 94103



## I. INTRODUCTION

Architects, engineers, and city planners designing urban structures are limited by lack of information on wind effects brought on by the presence of these structures, such as discomfort for pedestrians and wind-caused mechanical problems with doors, windows, and ventilating systems. Once a structure is built, remedial measures (if they exist at all) are usually very expensive.

It is virtually impossible to anticipate, by analysis or intuition, the winds that will be caused by a structure, since they are determined by very complex interactions of forces. It is possible to predict wind patterns and pressures around structures by testing scale models in a wind tunnel that can simulate natural winds near the ground. This allows the designer to foresee possible environmental and mechanical problems and alleviate them before the building is erected.

The purpose of this study is to determine the wind and comfort conditions on the site before and after construction of the proposed project, and to assist the designer to avoid climate- and wind-related problems.

## II. SUMMARY

Wind tunnel tests were conducted on a scale model of the proposed structure to determine the building's effect on wind and pedestrian comfort and safety near the site.

The site currently has low to moderate winds compared to other areas of San Francisco. Winds vary considerably with location near the project; the highest winds are found on the east side of Montgomery Street north of the site. The area is shadowed during all seasons.

The effect of the proposed building on winds would vary with location, with some areas experiencing increases and others decreases. Winds would be increased close to the site and would decrease along Montgomery Street opposite the site and

to its east along Bush Street. The project would increase shadows along Bush Street across from the site in spring, summer, and fall. The courtyard area would be shadowed all year.

The project would increase pedestrian discomfort slightly due to chilling by the wind. The greatest increase would occur on the north side of Bush Street, where both winds and shadows would increase. East of the site, comfort would improve due to lighter winds.

### III. SITE DESCRIPTION

The project site is the southeast corner of Montgomery and Bush Streets in the San Francisco Financial District. It is now occupied by four buildings 65, 57, 50, and 22 feet high. The surrounding area is entirely developed, so that the site is sheltered for all wind directions except west and south-west.

The proposed project is a 416-foot high-rise with a courtyard abutting its east side. The building is recessed at street level, allowing pedestrian circulation from the courtyard to Montgomery Street.

### IV. PROJECT INFLUENCE ON WIND AND COMFORT

#### A. ELEMENTS OF COMFORT IN SAN FRANCISCO

The elements that influence comfort are temperature, humidity, sunshine, precipitation, and wind. Their relative importance varies with geographical location and the characteristics of the local climate. For the San Francisco region, the most important factors are temperature, solar radiation, and wind.

Temperatures in San Francisco are moderate owing to the influence of marine air. Temperatures are highest in fall and

lowest in winter; both spring and summer are normally cool, with a high frequency of low clouds and fog.

The intensity and frequency of sunshine are normally integrated into a single figure and expressed as "percentage of possible sunshine." San Francisco has two peak periods of sunshine, in April and in September. These months normally correspond to the transition periods between the strong marine airflow of summer and the transient storms of winter.

Wind in San Francisco is strongest in late spring and throughout the summer months, and lightest in winter. Summer winds have a large daily variation, with light winds during night and morning hours and peak winds in the afternoon. Westerly winds are dominant in all months but December and January.

The planner or architect has no control over outdoor temperatures. He does, however, have some control over the pattern of sunlight and shade and the speed of the wind. In the cool climate of the Bay Area, providing a comfortable outdoor environment requires maximizing exposure to sunlight while reducing winds as much as possible.

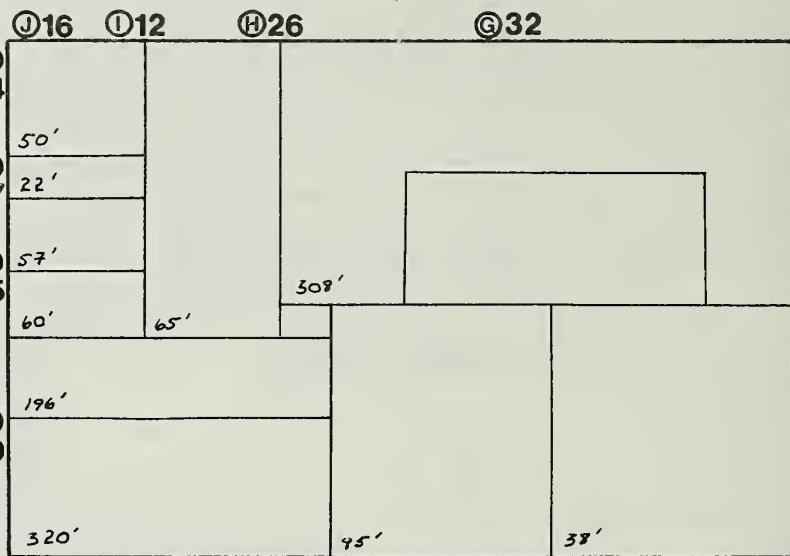
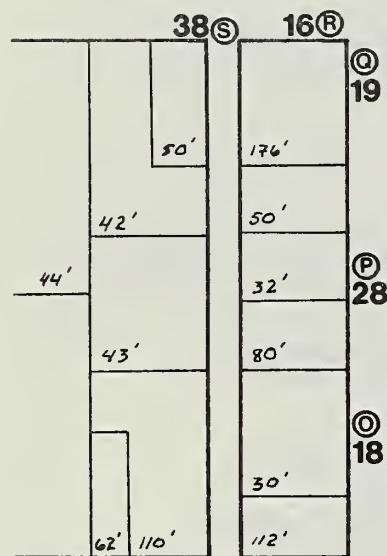
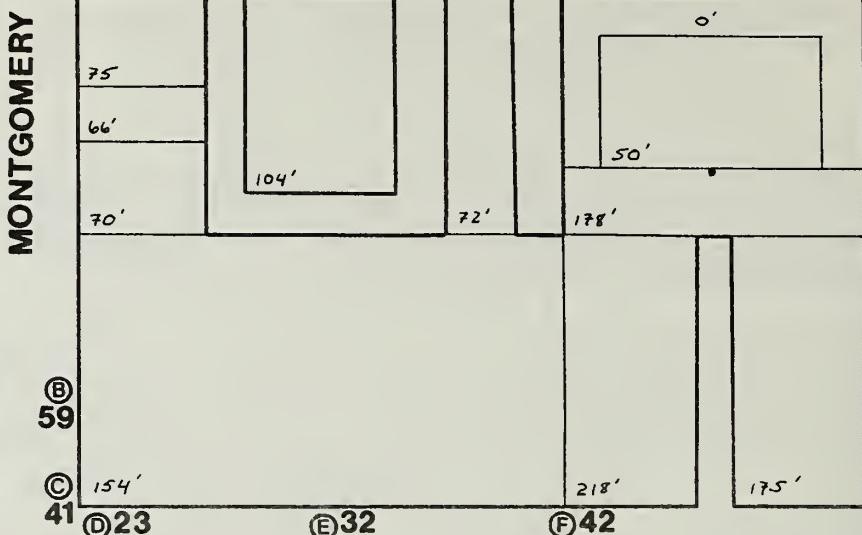
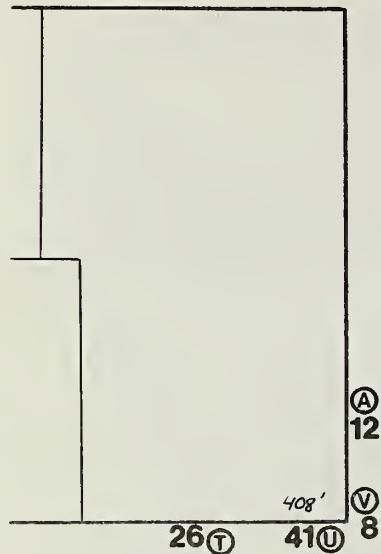
Winds on the site have been analyzed in terms of the Wind Strength Index (WSI), which is explained in Section VI.B3. The WSI integrates wind measurements over all wind directions to produce a single value that can be interpreted as follows:

<u>Wind Strength Index</u>	<u>Interpretation</u>
0 - 20	Low winds
21 - 44	Moderate winds
45 - 70	High winds
above 70	Very high winds

Frequency of discomfort and average wind speed are proportional to the WSI. Based on the above, changes in WSI of about 15 are considered significant, since they are likely to cause changes in category.

Wind Strength Index values for the existing site are shown in Figure 1. Values are generally low to moderate; the highest value, 59, is found at Point B, on the east side of Montgomery Street north of the site. The pedestrian areas immediately adjoining the site have moderate values along Montgomery and low values along Bush Street.

Figures 3, 4, and 5 show areas currently in shadow at 1 p.m. on the first day of each season. In winter, all pedestrian areas

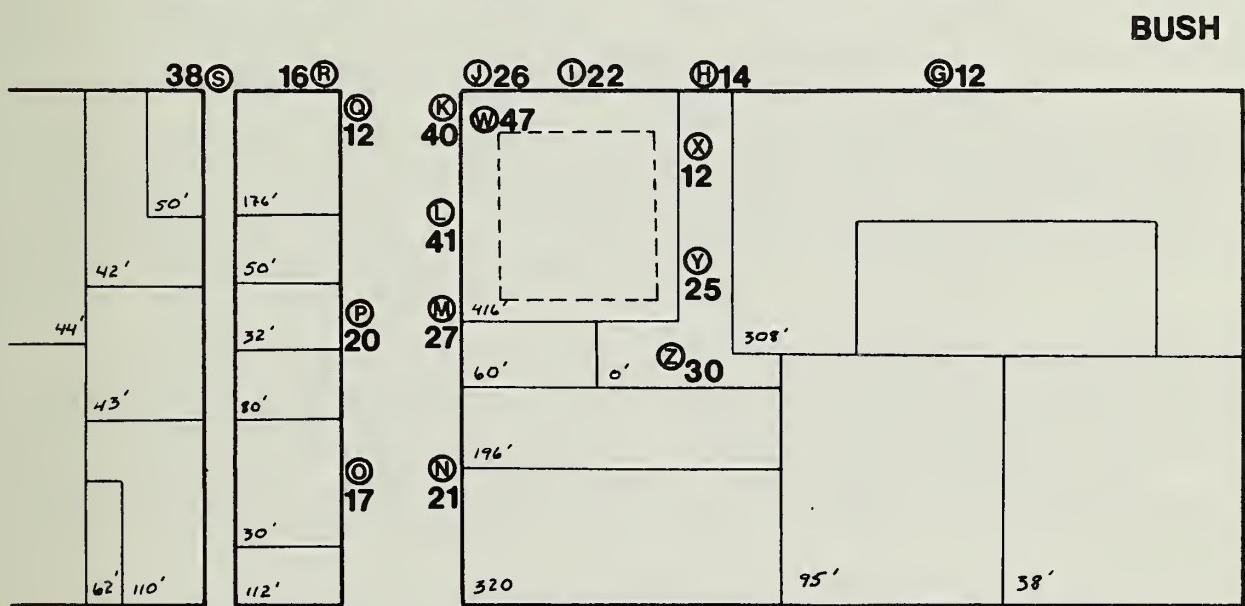
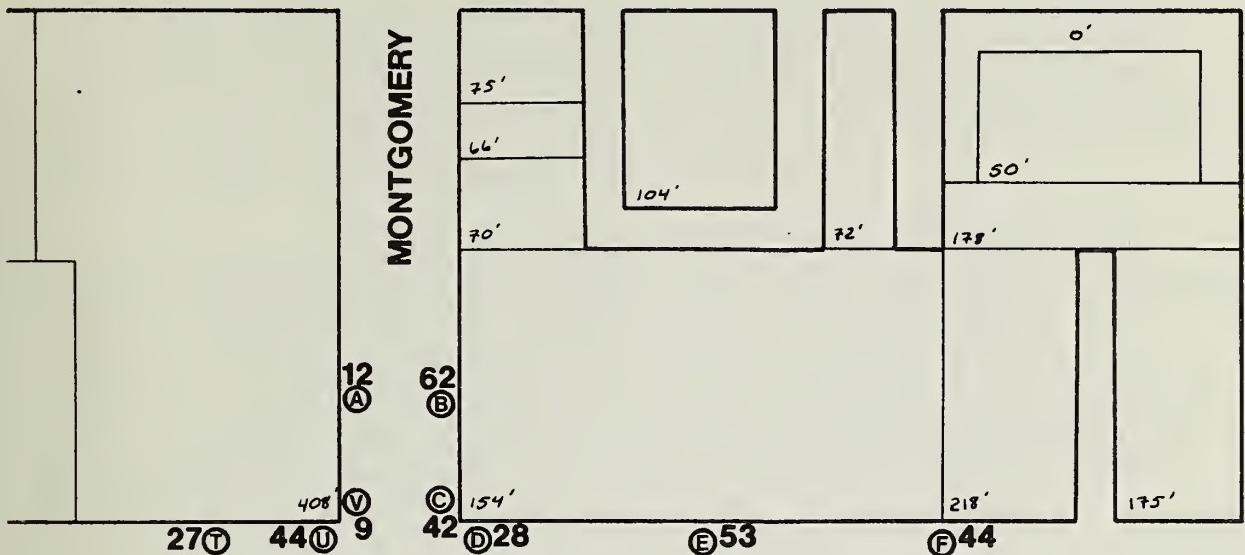


## EXISTING SITE WIND STRENGTH INDEX

(See Section VI.B.3 for definition)



FIGURE 1



SANSOME

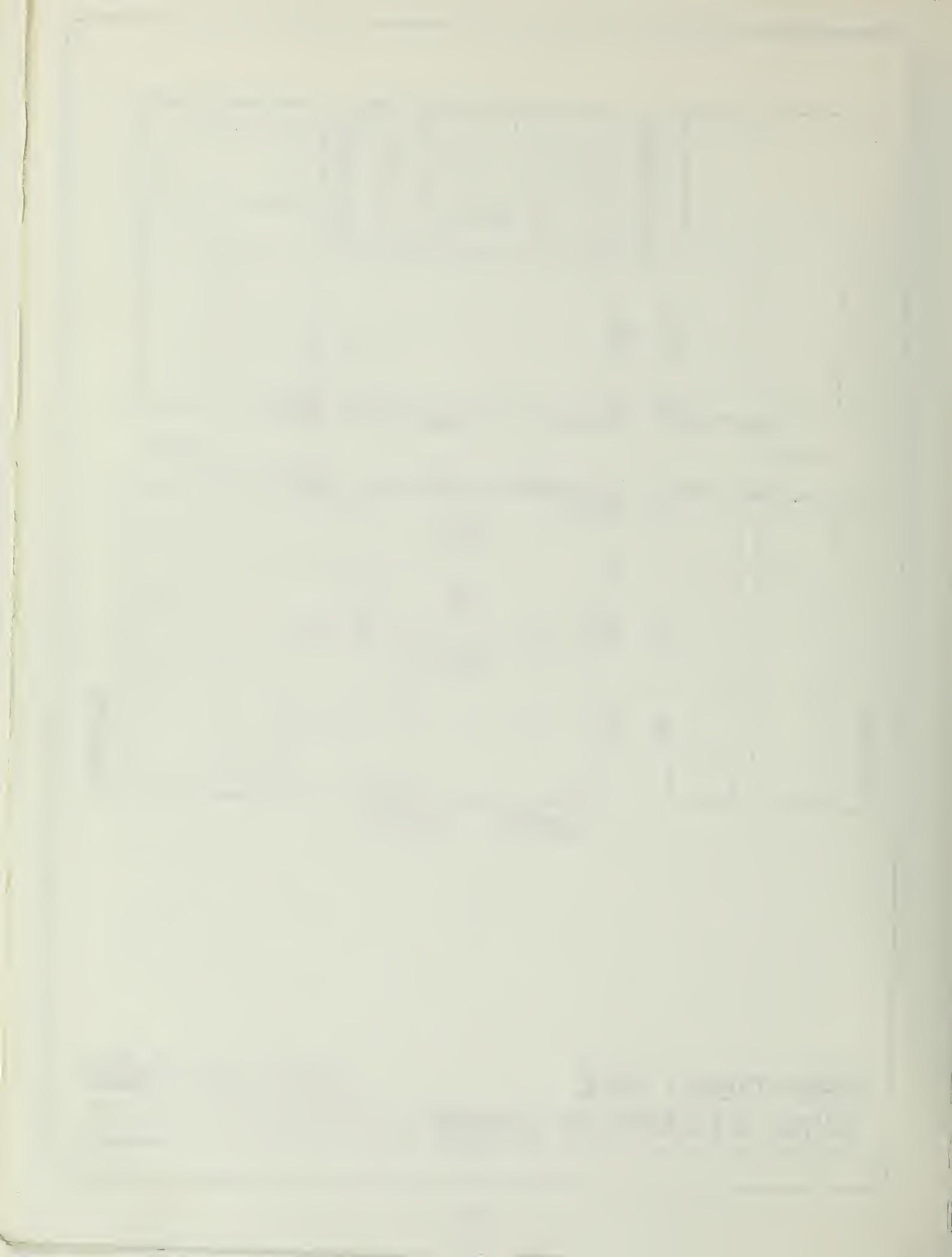
**SUTTER**

## PROPOSED SITE WIND STRENGTH INDEX

(See Section VI.B.3 for definition)



**FIGURE 2**



except the northeast and southeast corners of the Montgomery-Bush intersection are in shadow. During spring or fall the east side of Montgomery near the project site and the north side of Bush opposite the site are sunny. Considerably more area is sunny in summer; however, the west side of Montgomery and the south side of Bush are in shadow.

On the basis of the Wind Strength Index and the extent of shadows in pedestrian areas near the site, discomfort frequencies are probably low to moderate. Along Montgomery Street adjacent to the site, winds are moderate but sunshine is frequent. Along Bush (near the site), winds are low, but the area is generally shadowy. Higher discomfort frequencies occur along Montgomery north of the site and along Bush east of the site, where winds are moderate to high and the area extensively shadowed.

#### C. SITE CONDITIONS WITH THE PROPOSED PROJECT

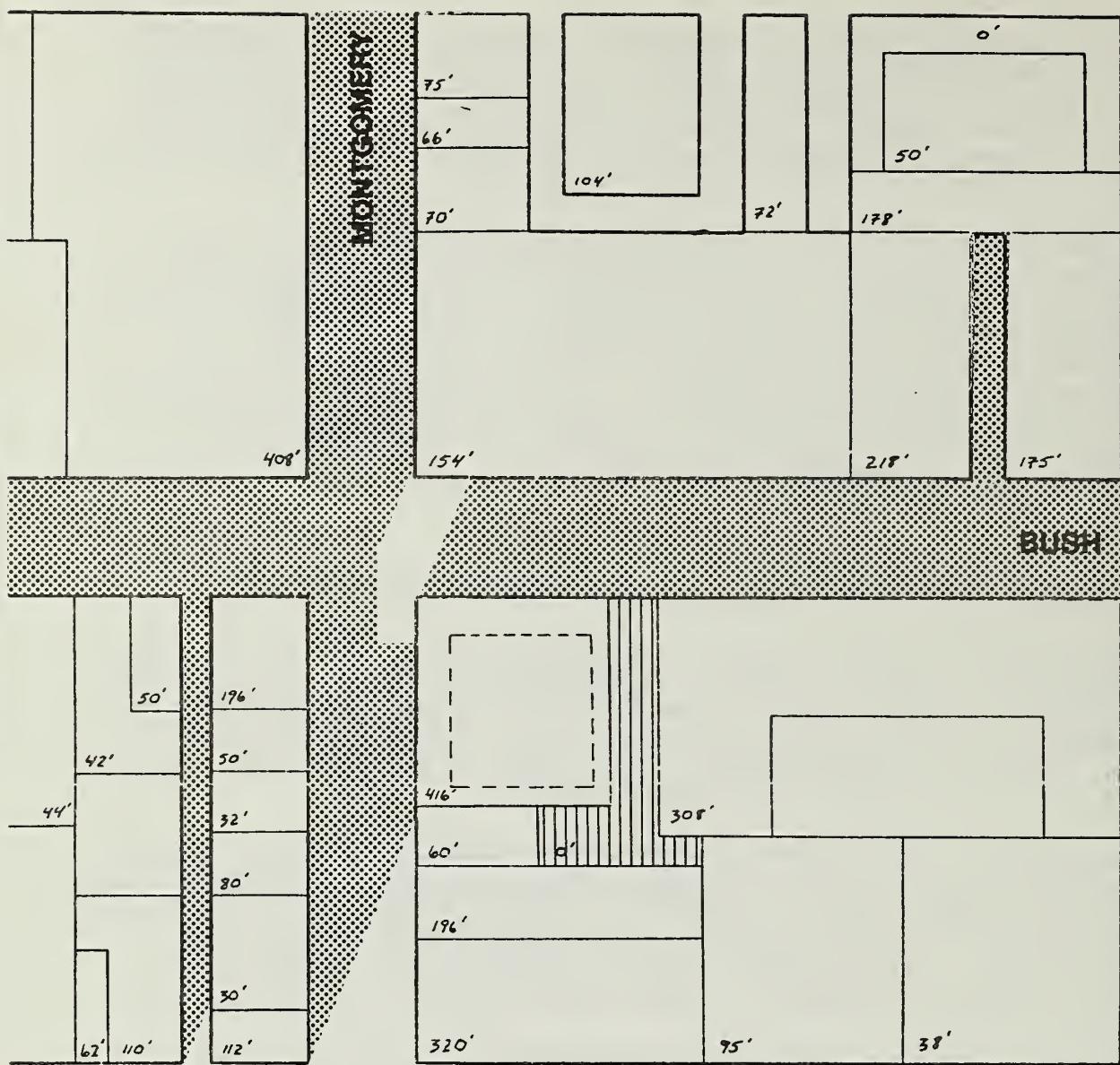
The effects of the project on winds near the site would vary (Figure 2). Winds would be increased adjacent to the proposed structure. Along its Montgomery Street side, increases would be small (on the order of 5 WSI units) and winds would remain low. Along the Bush Street side, winds would increase from a "low" to a "moderate" classification.

The project would reduce winds along Montgomery Street opposite the site and would have little effect along Montgomery to its north or along Bush to its west. East of the site, winds would be reduced along the south side of Bush and increased along its north side. The largest increase would occur at Point E, where current "moderate" winds would increase to "high" winds.

Changes in shadow patterns associated with construction of the proposed project are shown in Figures 3, 4, and 5. In winter (Figure 3) the entire area is dominated by shadows from existing buildings, and the project causes no increase in area of shadow. The proposed courtyard would be fully shaded.

In fall and spring (Figure 4), the project would shadow the area north of the site along Bush Street, and the courtyard would be completely shaded.

In summer (Figure 5), the project would create a large new area of shadow on the north side of Bush. Again, the courtyard would be entirely in shadow.



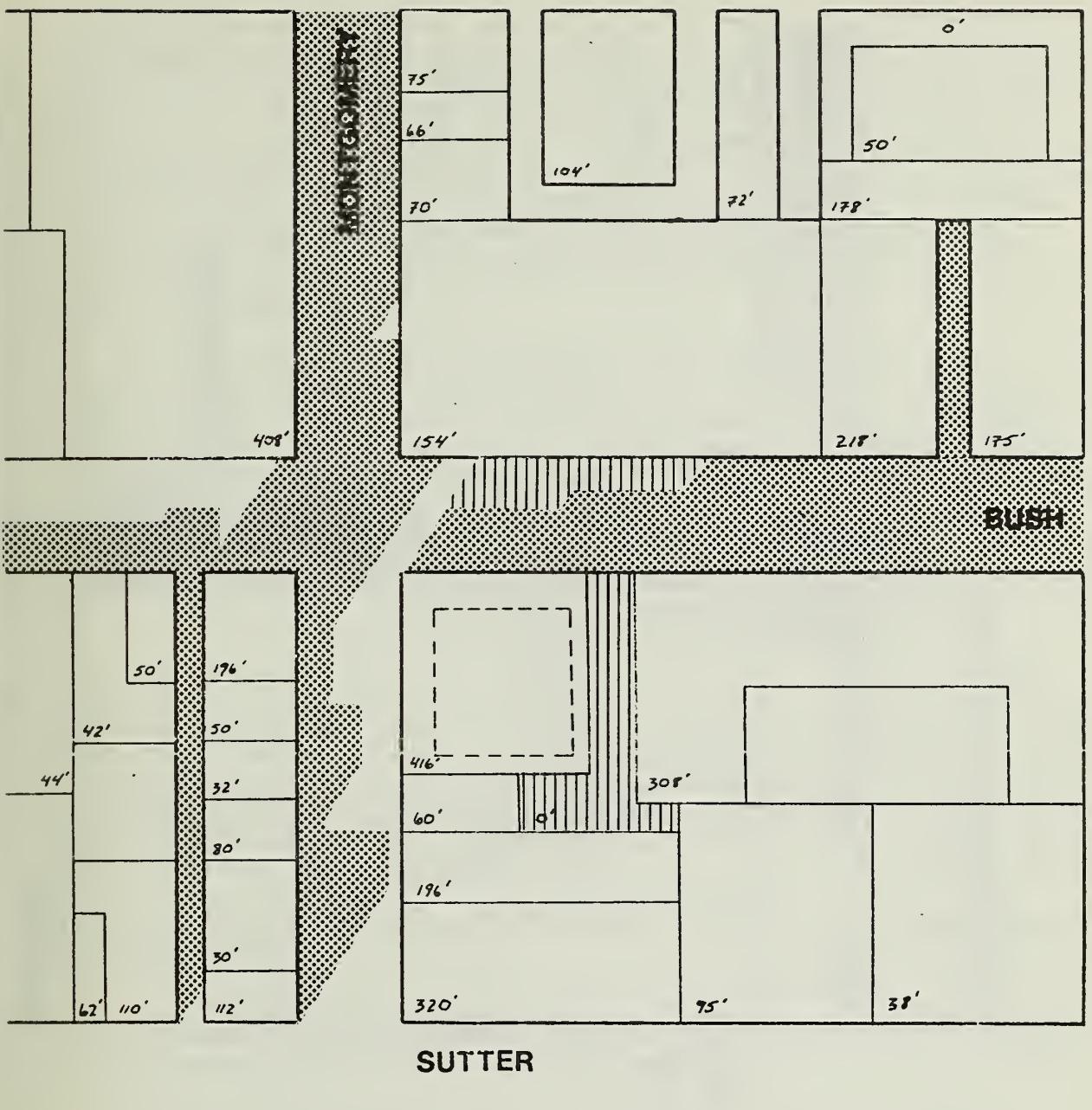
WINTER: 1 PM

## PROPOSED SITE SHADOW DIAGRAM

EXISTING SHADOW  
 PROJECT SHADOW



FIGURE 3

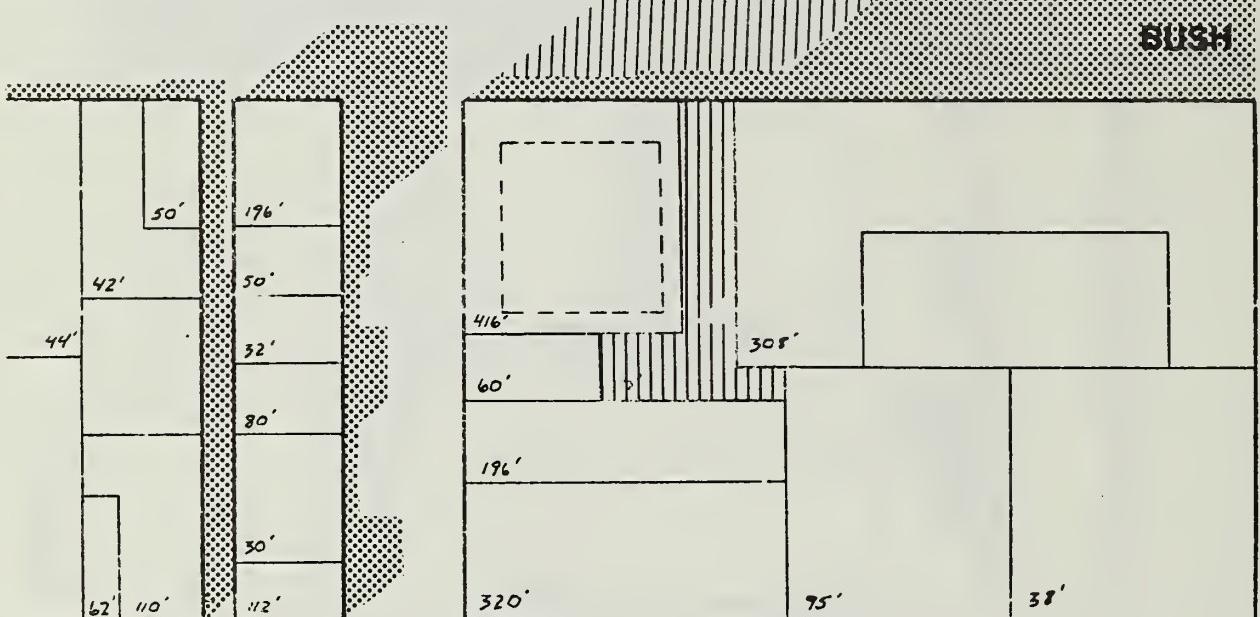
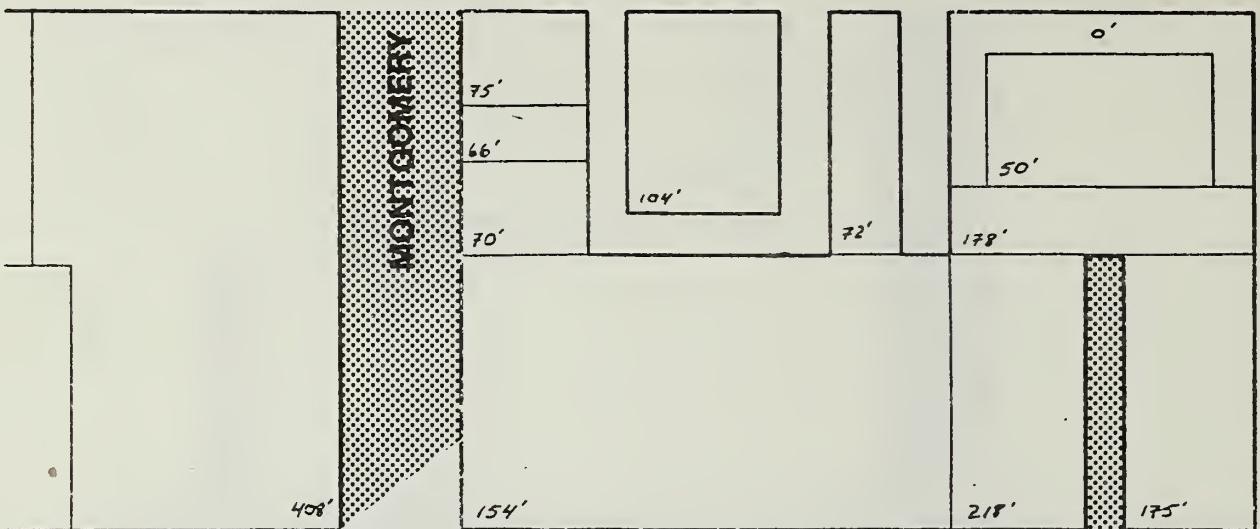


EXISTING SHADOW  
 PROJECT SHADOW

## PROPOSED SITE SHADOW DIAGRAM



FIGURE 4



**SUMMER: 1 PM**

■ EXISTING SHADOW  
■■■ PROJECT SHADOW

## PROPOSED SITE SHADOW DIAGRAM



FIGURE 5

The resulting effect on the frequency of discomfort would vary across the study area. Increases in winds along the east side of Montgomery would result in slightly higher discomfort frequencies. Along the south side of Bush Street, discomfort frequencies would increase near the site but would decrease to its east. The greatest impact would be exerted on the north side of Bush opposite the site, where substantial increases in winds and shadows would raise the frequency of discomfort noticeably. Little effect would be felt west of the Bush-Montgomery intersection.

The courtyard east of the building would have little or no sunlight and would have low to moderate winds. The frequency of discomfort in this area would be similar to that currently existing along the south side of Bush near the project site.

## V. MITIGATION OF ADVERSE WIND EFFECTS

Measures to reduce winds and increase comfort can be developed at several scales, ranging from large-scale modifications of the project's grading plan to construction of small wind barriers in important areas. The following is a discussion of possible design modifications that would reduce winds and increase comfort, starting at the largest scale.

In considering these possible modifications, two factors should be considered:

- These measures are based on aerodynamic principles alone. Other factors such as cost, aesthetics, and access must also be considered.
- The effectiveness of each possible measure has not been quantified. The actual ability of a measure to reduce winds can be determined only by further experimentation in a wind tunnel.

### A. MODIFICATIONS TO THE STRUCTURE

A variety of building modifications can reduce exposure to wind. Building height, shape, bulk, width, orientation, surface treatment, and location with respect to other structures all affect

winds. Of these factors, location, shape, and orientation are determined by the lot and are not variable.

Reduction in building height would result in smaller wind-speed increases. Although the actual decrease with a smaller size is not known, decreases would be roughly proportional to the percentage reduction in proposed building height. For example, the resulting wind increases (and wind decreases in some areas) from a 10 percent height reduction would be roughly 10 percent. Taller buildings cause greater changes in wind speeds. Increasing the height of the building to 500 feet would increase the project's effect on winds by 20 percent.

Use of the site solely as an urban plaza was not studied in the tunnel; therefore, quantifiable effects cannot be given. It is known, however, that such a plaza would be shadowed much of the day by the Standard Oil Building to the east and the Equitable Life Building to the south. The eastern portion of such a plaza would be exposed to strong winds caused by the Standard Oil Building and would frequently be uncomfortable.

Other building shapes could reduce winds, although the shape of the lot is a constraining factor. Elimination or modification of the pedestrian area created by the building's setback at the ground floor could improve wind conditions to a minor extent. Elimination of the setback, however, would remove the pedestrian refuge from rain that is offered by the overhang.

Wind conditions in the courtyard east of the building could be improved by architectural modifications. A glass wall with a door (preferably revolving) on the ground-level passage south of the building between the courtyard and Montgomery Street would significantly reduce winds in the courtyard. Placing the courtyard below grade would have a similar effect and would not reduce the frequency of sunlight since no sunlight would reach the courtyard.

## B. LANDSCAPING

Landscape is not an effective method of making major modifications in wind-flow patterns but is useful in creating local areas of shelter where needed. Provision of substantial vegetation would reduce winds throughout the site. To be most effective, vegetation should be dense and should extend from near ground level to at least 15 feet high. While any vegetation absorbs the momentum of the air and reduces winds,

proper selection of plant type, height, spacing, and orientation is necessary to maximize the mitigating effect.

All pedestrian areas near the building would benefit from planting of substantial vegetation. Since these areas are rarely in sunlight, the effect of vegetation would be to reduce winds, leaving sunlight patterns unchanged.

Bus shelters would increase pedestrian comfort by offering protection from wind and rain.

## VI. METHODOLOGY

### A. MODEL, WIND TUNNEL, AND TESTING METHODOLOGY

A complete description of model-making methodology, the wind tunnel facility, and the testing methodology is given elsewhere (San Francisco Department of City Planning 1976).

### B. WIND STRENGTH INDEX

The wind at a given location, and the resulting level of comfort experienced, depend on several factors at different scales. On the local scale, terrain and building geometry affect wind strength and direction by blocking, channeling, diverting, deflecting, or accelerating winds. At pedestrian levels the wind pattern may be quite distorted even though the wind is from one general direction. This pattern of local winds will, of course, change as the general wind direction changes, so there is no one wind pattern that can be defined for a site.

Because the wind pattern at a site varies with direction, the frequency of each wind direction is very important. The importance of an extreme wind acceleration around a building corner under a north wind is greatly diminished, for example, if north winds occur only one percent of the time.

Both of the above factors are included in the derivation of the Wind Strength Index (WSI). The steps involved in computing the WSI are:

1. For each wind direction (in this case, the five

most important directions), the strength of the wind is measured at every point of interest on the site.

2. At each point of interest, wind strength for each direction is weighted by the frequency of winds from that direction. To obtain the WSI, these values are summed and converted to percentages.

Use of the Wind Strength Index results in a single map that summarizes the wind measurements made for all wind directions. Based on WSI values computed for other areas of San Francisco, the plotted WSI values can be interpreted as follows:

<u>Wind Strength Index</u>	<u>Interpretation</u>
0 - 20	Low winds
21 - 44	Moderate winds
45 - 70	High winds
Above 70	Very high winds

The pattern of the Wind Strength Index represents the pattern of winds that would be experienced on the site over a long period of time (a year, for example). On any given day, of course, the actual wind pattern on the site could vary greatly from the WSI pattern. As a direct measure of average winds, the WSI is also a direct measure of the frequency of wind-caused discomfort. While a specific frequency of discomfort cannot be specified for a given WSI value, discomfort frequency is proportional to WSI. Because it is based on mean wind measurements, the WSI does not account for turbulence. Areas where turbulence would be expected would have a higher frequency of discomfort than indicated by the WSI.

## VII. TECHNICAL DATA AND DISCUSSION

The following is a discussion of wind conditions on the site for each wind direction investigated. Information on wind directions over the site is shown in Figures 6 through 15. The wind direction at each measurement point is shown. The major flow path over the site, when applicable, is indicated by a large arrow.

Individual wind speed measurement data are presented in Table 1.

Measured wind speeds are expressed as percentages of the calibration wind speed, which corresponds to the actual wind speed at the San Francisco Weather Station at 50 Fulton Street. Thus a value of 0.52 means that the measured wind speed is expected to be 52 percent of the wind speed recorded by the Weather Service when winds are from that particular direction.

The values can be interpreted in terms of general "windiness" using the scale below. This scale is subjective and is based on information gathered from studies in San Francisco.

<u>Velocity</u>	<u>Relative Wind Value</u>
Low	0.00 - 0.19
Moderately low	0.20 - 0.29
Moderate	0.30 - 0.49
Moderately high	0.50 - 0.69
High	0.70 - 1.00
Very high	Above 1.00

It should be noted that the plotted values are not actual wind speeds, but ratios. Thus a point having "very high" wind speeds would still experience light winds on a near-calm day. Likewise, a point found to have "low" winds could experience significant winds on an extremely windy day.

#### A. NORTHWEST WIND

Northwest winds occur 12 to 39 percent of the time in San Francisco, depending on the season. (In meteorology, a northwest wind blows from the northwest.) Northwesterly and westerly winds are the most frequent and strongest winds at all seasons in San Francisco. Northwest winds exceed 13 miles per hour 35 percent of the time and 25 miles per hour 3 percent of the time in summer. Wind frequencies and speeds are lower in spring, fall, and winter.

#### Existing Site

Figure 6 shows that existing wind flow patterns. Arrows indicate wind direction; double circles around the points indicate turbulent areas.

The major wind movement is down Bush Street, and there are

Table 1 Relative Wind Values  
 (Keyed to Locations on Appendix F Figures)

Point	Existing NW	Proposed NW	Existing W	Proposed W	Existing SW	Proposed SW	Existing S	Proposed S	Existing SE	Proposed SE
A	.13	.13	.11	.11	.11	.11	.11	.09	.13	.17
B	.40	.40	.70	.79	1.02	.98	.69	.69	.10	.15
C	.34	.34	.49	.57	.50	.43	.24	.29	.10	.15
D	.23	.28	.19	.28	.30	.36	.36	.36	.08	.06
E	.23	.34	.38	.74	.55	.70	.40	.49	.06	.08
F	.28	.28	.53	.60	.61	.68	.40	.29	.13	.13
G	.23	.09	.38	.13	.43	.16	.29	.09	.13	.13
H	.21	.13	.30	.13	.36	.25	.33	.13	.08	.10
I	.15	.23	.09	.23	.11	.23	.16	.09	.08	.06
J	.15	.26	.09	.30	.34	.27	.29	.16	.10	.08
K	.30	.28	.45	.51	.30	.52	.29	.40	.06	.06
L	.38	.28	.43	.38	.30	.30	.29	.29	.08	.06
M	.43	.30	.36	.30	.27	.18	.29	.27	.08	.06
N	.34	.36	.13	.11	.11	.11	.24	.24	.08	.08
O	.19	.13	.13	.13	.11	.11	.24	.24	.52	.52
P	.36	.21	.21	.17	.23	.18	.31	.31	.29	.29
Q	.09	.19	.26	.26	.16	.14	.09	.09	.19	.19
R	.15	.15	.13	.13	.32	.32	.16	.16	.10	.10
S	.38	.38	.45	.45	.36	.36	.16	.16	.21	.19
T	.15	.17	.36	.36	.36	.36	.16	.16	.08	.06
U	.13	.15	.57	.60	.89	.89	.36	.36	.06	.06
V	.09	.09	.06	.06	.09	.09	.09	.07	.13	.21
W		.32		.62		.70		.33		.08
X		.09		.11		.20		.16		.06
Y		.19		.30		.70		.18		.06
Z		.21		.38			170 <sup>45</sup>	.11		.04

turbulent areas on Montgomery. Table 1 gives the relative wind values for each point in Figure 6. The site is generally calm; winds are in the low to moderate range. The highest value, 0.43, is at point M, at the southeast corner of the site.

#### Site with Proposed Building

As shown in Figure 7, wind flows with the proposed building would be generally the same, with the exception of the flow moving north on Montgomery Street, which would cut across Point W under the overhang. Wind would move toward the north in the courtyard. The relative wind values for each point are given in Table 1; they would both increase and decrease. Point M would decrease from 0.43 to 0.30, and the other points on Montgomery Street in the same flow would decrease. Winds would be generally low to moderate.

#### B. WEST WIND

West winds occur 15 to 40 percent of the time, depending on the season. West winds exceed 13 miles per hour 29 percent of the time and 25 miles per hour 7 percent of the time in summer. Wind strengths and frequencies are somewhat lower in spring, fall, and winter.

#### Existing Site (Figure 8)

The main wind movement is east down Bush and north on Montgomery Street. The west side of Montgomery is turbulent.

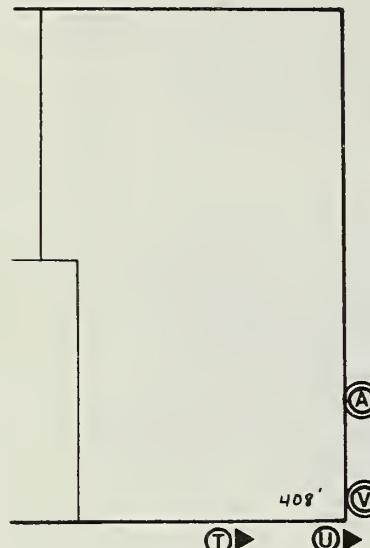
Table 1 gives existing relative wind values. Points U, B, and C have moderately high to high winds. The rest of the site is in the moderate to low range.

#### Site with Proposed Building

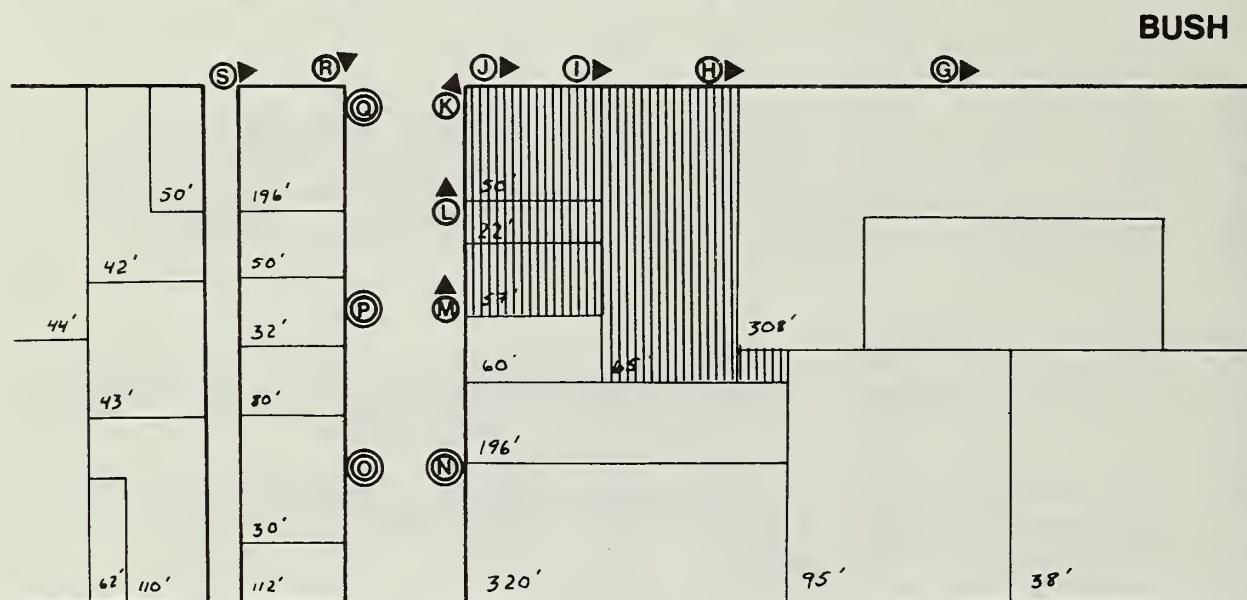
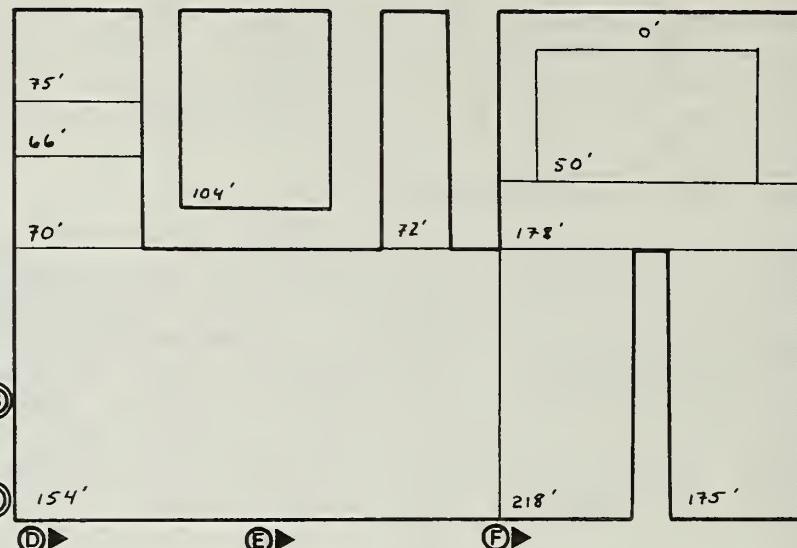
The major flow north on Montgomery Street would remain; however, values would be higher (see Figure 9 and Table 1). The relative wind values would generally increase throughout the site. Point W under the overhang would have moderately high winds. Winds in the courtyard would be low to moderate and turbulent.

#### C. SOUTHWEST WIND

Southwest winds occur on an average of 9 percent annually in



MONTGOMERY



SANSOME

SUTTER

$\textcircled{A} \rightarrow$  WIND DIRECTION  
AT POINT A

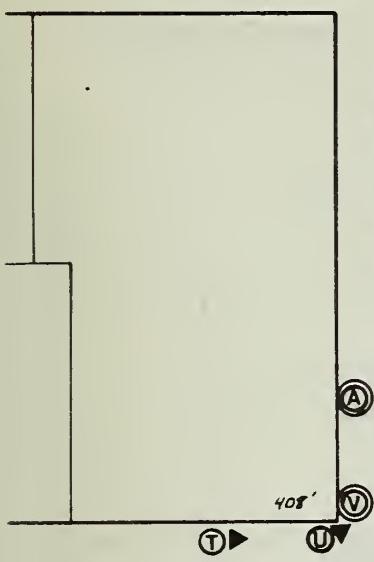
$\rightarrow$  MAJOR FLOW



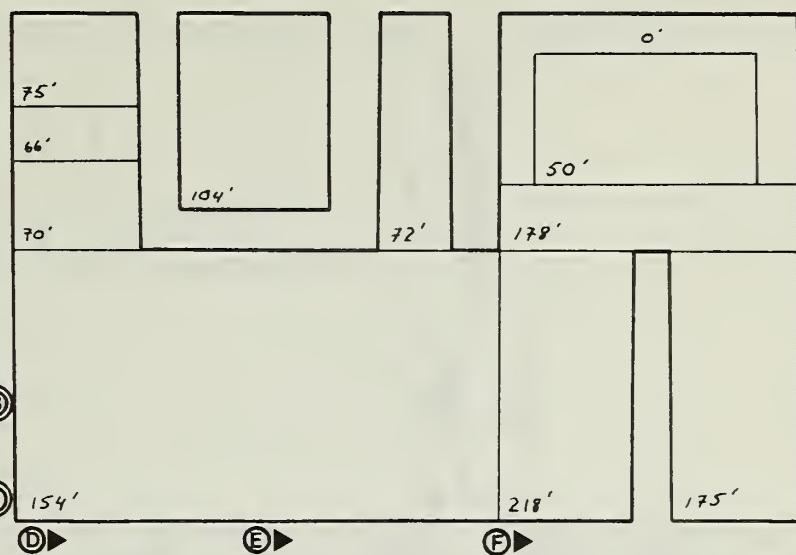
## EXISTING SITE WIND FLOW PATTERNS



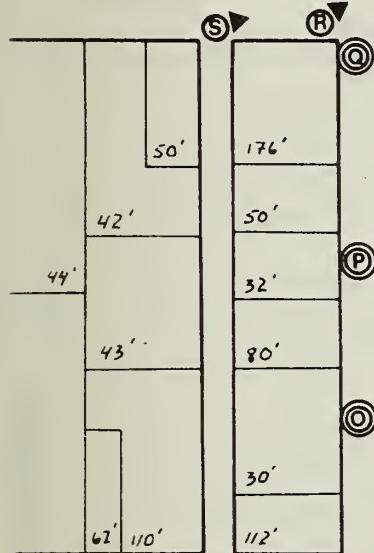
FIGURE 6



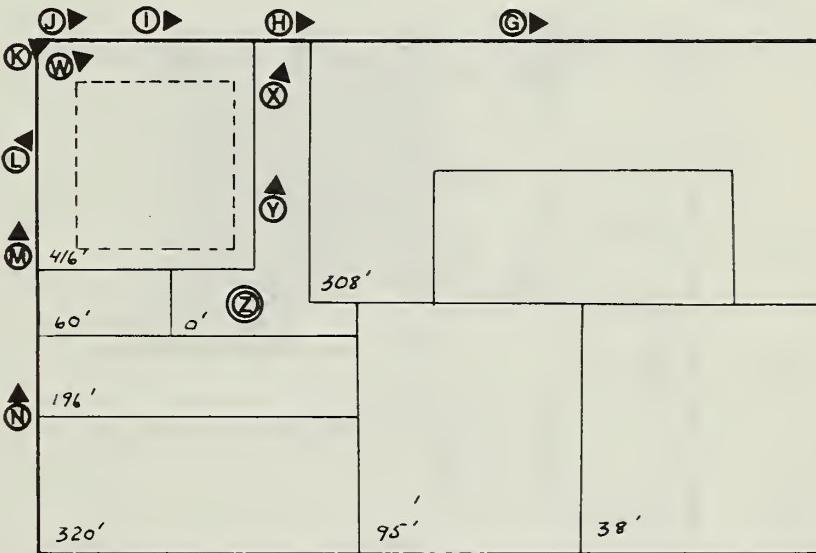
## MONTGOMERY



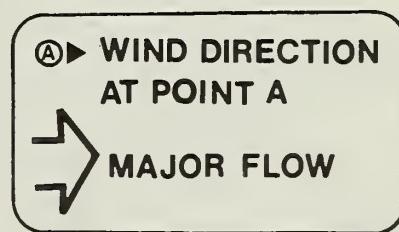
**BUSH**



SUTTER



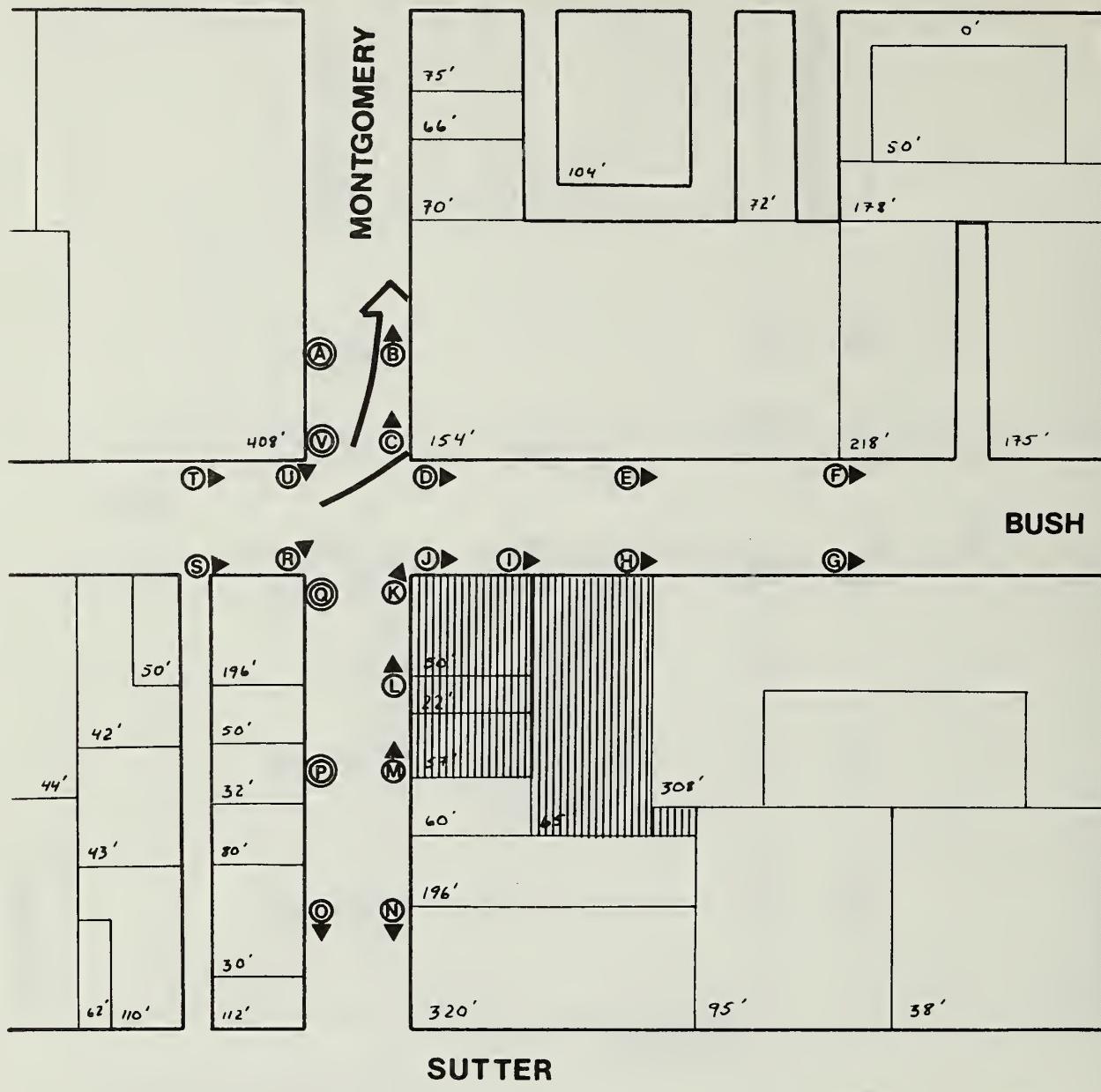
SANSONE



## **PROPOSED SITE WIND FLOW PATTERNS**



**FIGURE 7**

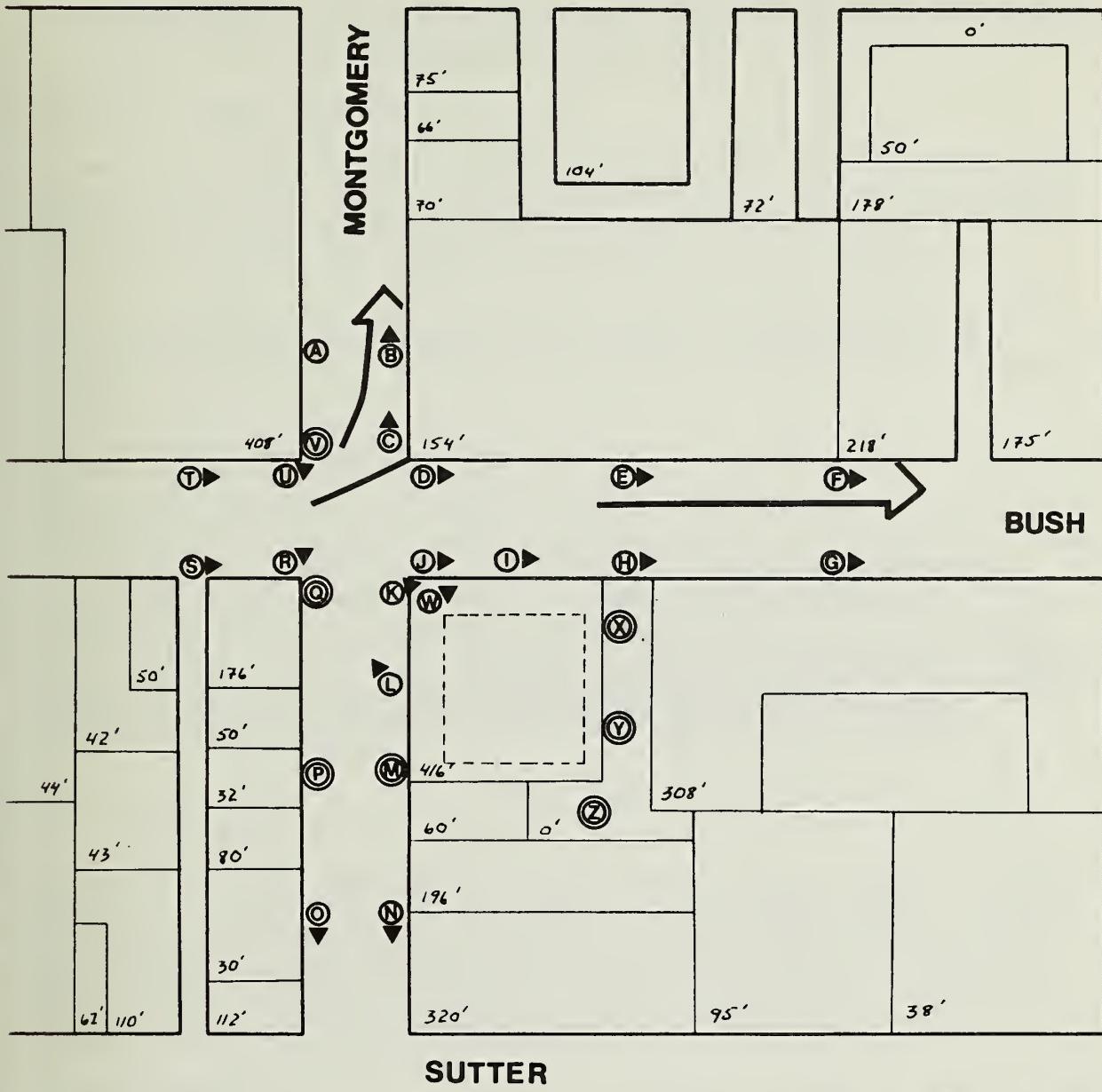


Ⓐ► WIND DIRECTION  
AT POINT A  
→ MAJOR FLOW

## EXISTING SITE WIND FLOW PATTERNS



FIGURE 8



## **PROPOSED SITE WIND FLOW PATTERNS**



**FIGURE 9**



**Ⓐ► WIND DIRECTION  
AT POINT A**

**→ MAJOR FLOW**



San Francisco. Winds are highest in winter, when they exceed 25 miles per hour 2 percent of the time.

#### Existing Site (Figure 10)

A major flow moves east on Bush Street; part of it turns the corner and moves north on Montgomery, and the rest continues eastward on Bush. Montgomery Street south of Bush is turbulent, as is the east side of Montgomery north of Bush.

Table 1 shows the relative wind values for each point. The two major flows have moderately high to very high winds. Point B has a value of 1.02. The site generally has moderate winds.

#### Site with Proposed Building

The major flows would remain essentially the same with the exception of Points K and W, feeding into the flow along Bush (see Figure 11 and Table 1). Point J would be somewhat shielded by the column on the corner of Montgomery and Bush. Intensity would be reduced at Points B and C and increased at Points K, E, and F. Point W would have high winds. Point Y in the courtyard would have high winds caused by a strong flow through the passage leading to Montgomery Street.

#### D. SOUTH WIND

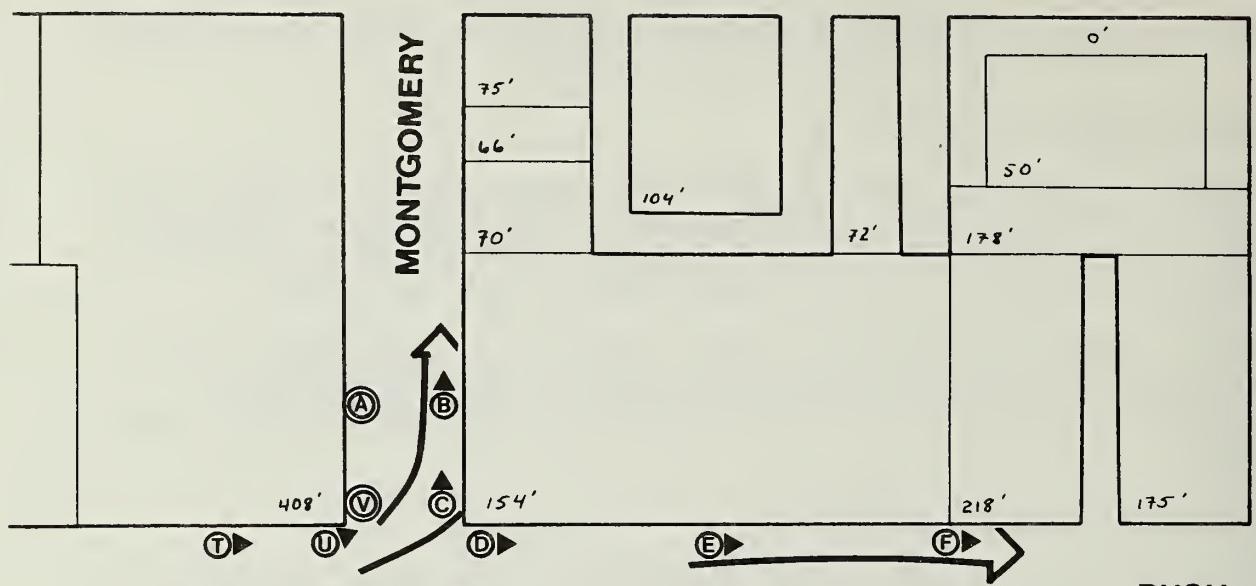
South winds are infrequent except during winter storms, when moderate to strong wind is often combined with rain. They are expected to occur 12 percent of the time in the months of December through February, exceeding 13 miles per hour 1 percent of the time. During other seasons south winds are light and occur less than 3 percent of the time.

#### Existing Site

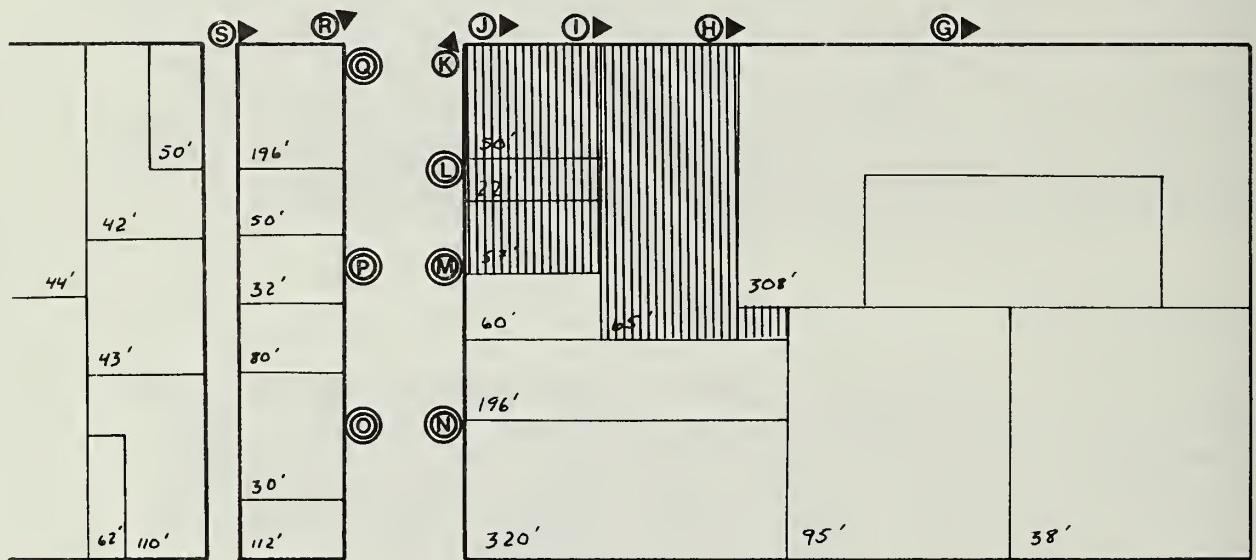
South winds on the site are low to moderate (see Figure 12 and Table 1). The site is calm on the whole, except at Point B, being protected from south winds by the large buildings along Market Street.

#### Site with Proposed Building

Little effect would be exerted on south winds except at several points where there would be small decreases and increases in wind speed. The courtyard would be calm, and Point W would have moderate winds (see Figure 13 and Table 1).



**BUSH**



**SANSOME**

**(A)► WIND DIRECTION  
AT POINT A**

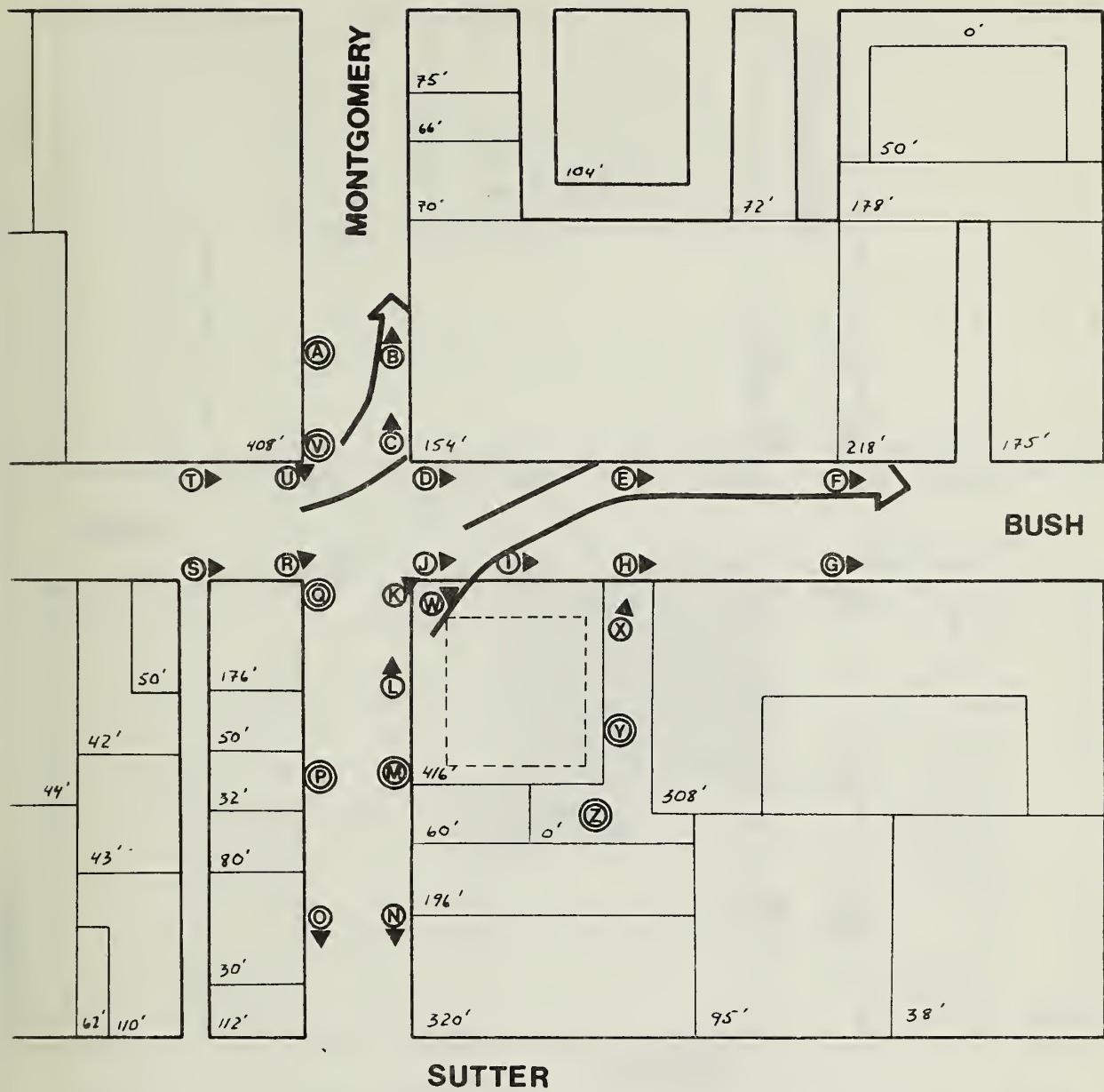
**MAJOR FLOW**



## EXISTING SITE WIND FLOW PATTERNS



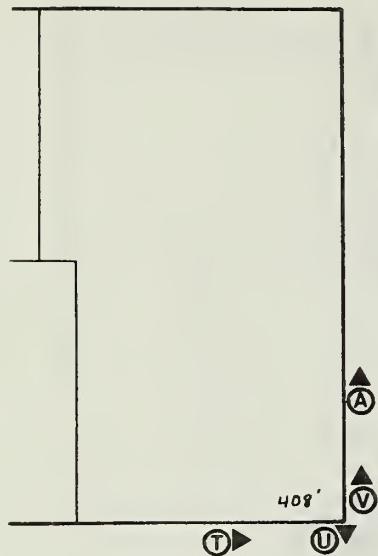
FIGURE 10



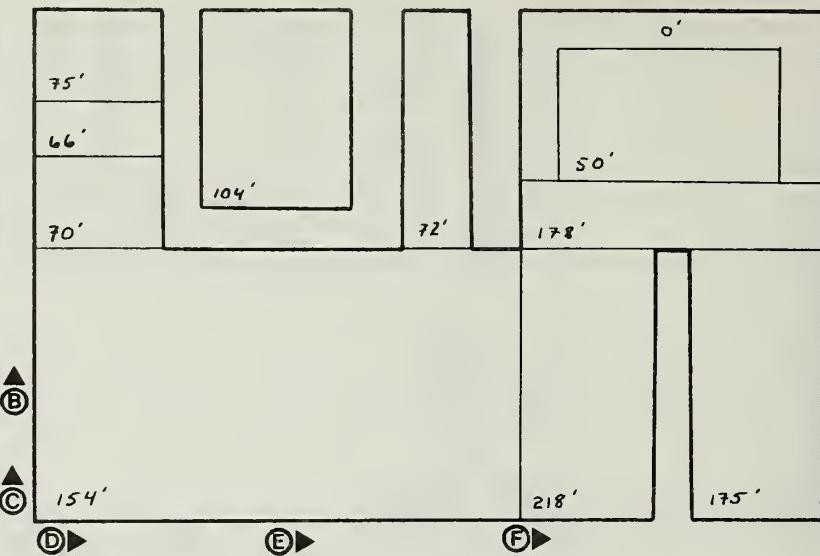
## PROPOSED SITE WIND FLOW PATTERNS



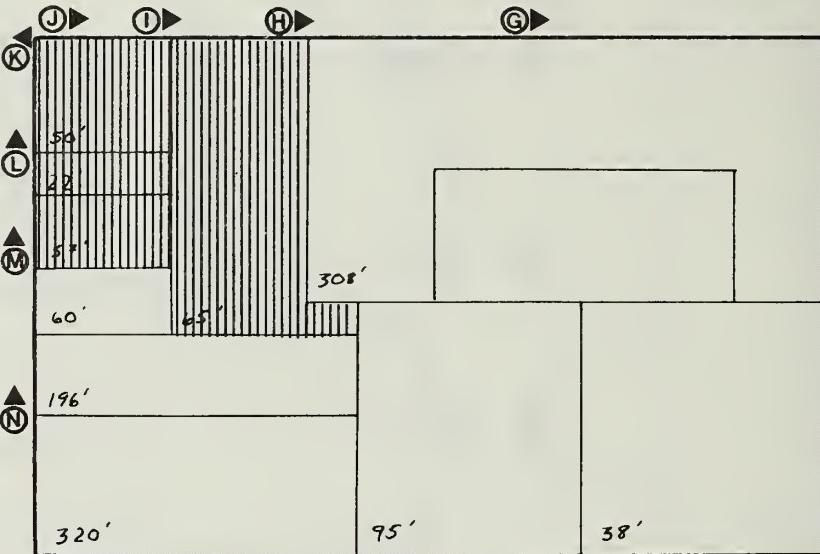
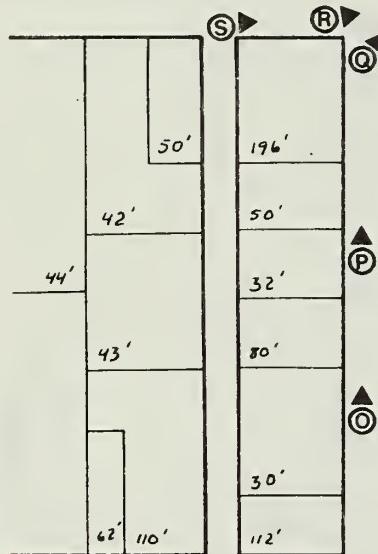
FIGURE 11



MONTGOMERY



BUSH



SANSOME

SUTTER

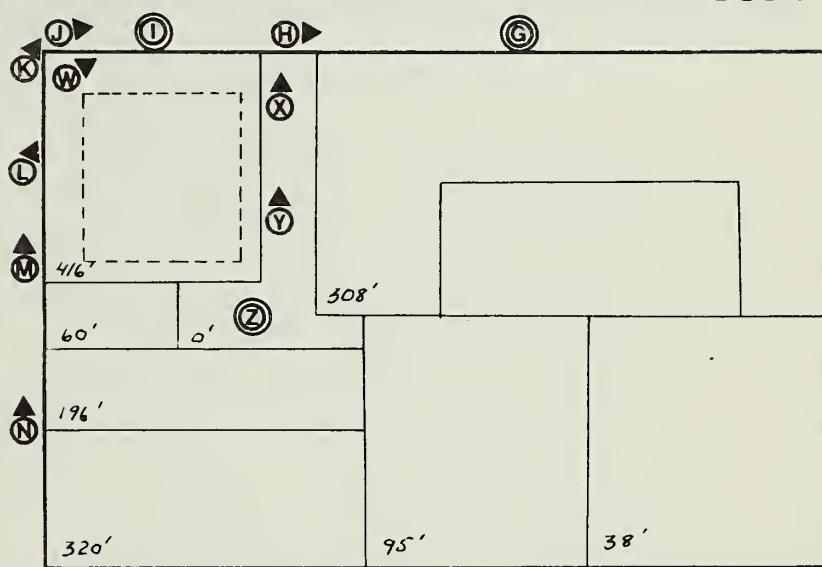
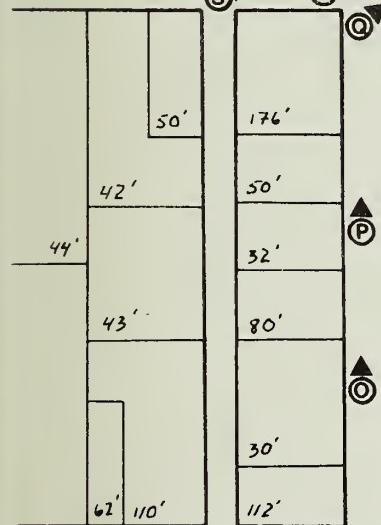
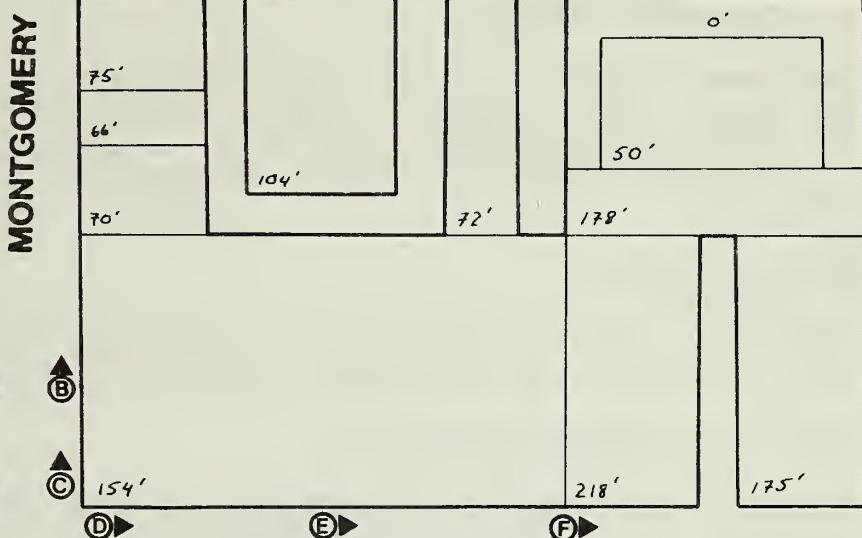
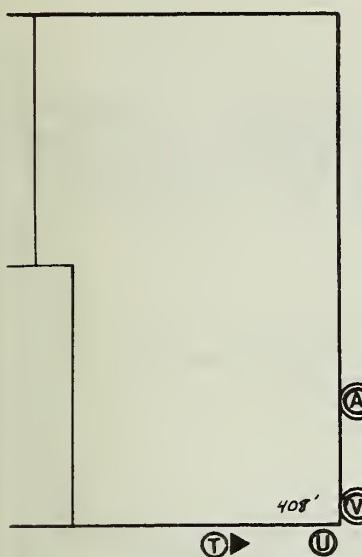
Ⓐ► WIND DIRECTION  
AT POINT A  
→ MAJOR FLOW



## EXISTING SITE WIND FLOW PATTERNS



FIGURE 12



### SUTTER

Ⓐ► WIND DIRECTION  
AT POINT A



MAJOR FLOW



## PROPOSED SITE WIND FLOW PATTERNS

FIGURE 13

#### E. SOUTHEAST WIND

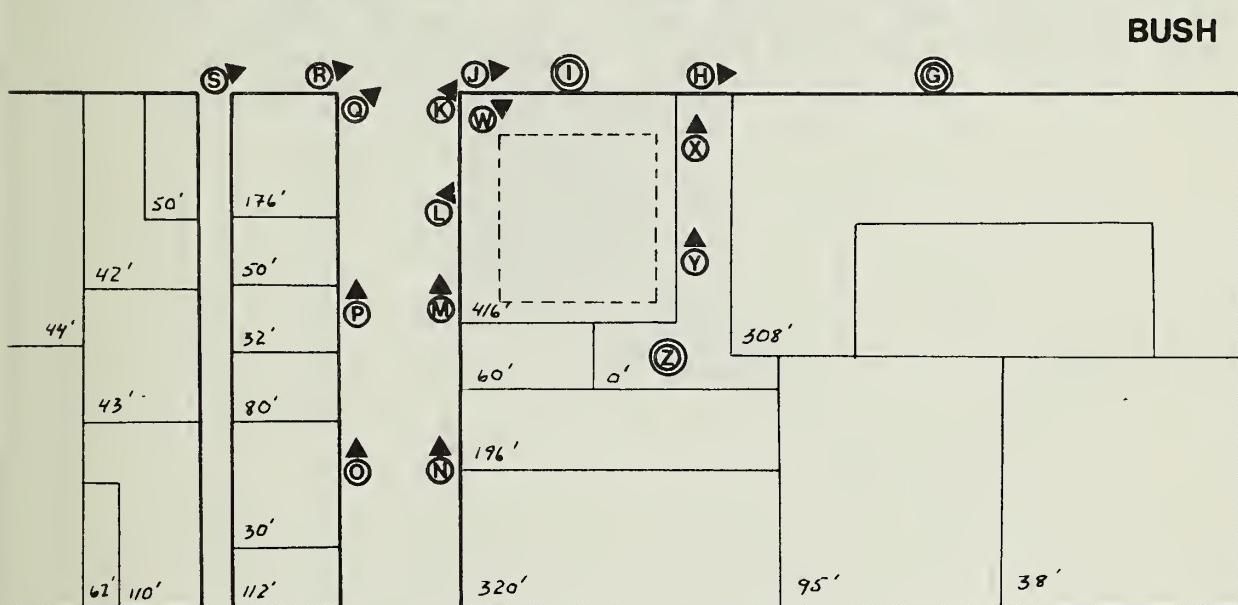
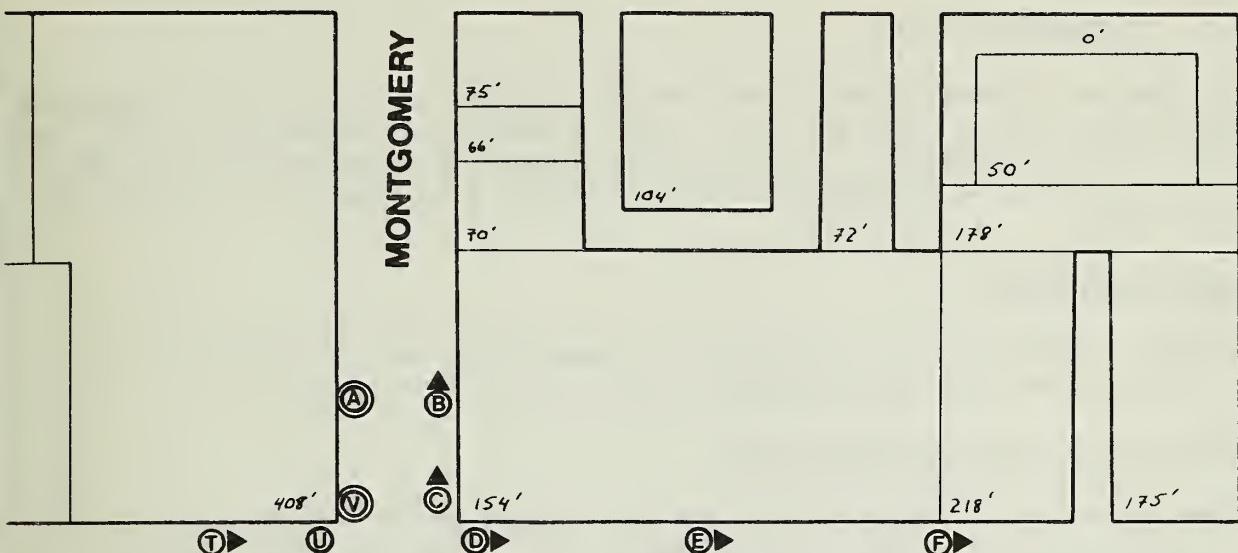
Southeast winds occur less than 3 percent of the time in spring and summer and 6 percent in fall. They are generally light during these seasons. In winter they can be expected 17 percent of the time, with speeds over 13 miles per hour 10 percent of the time.

##### Existing Site

Except for Point D, the site is basically calm (Figure 14), being protected by Financial District high-rises.

##### Site with Proposed Building

The site would remain calm after construction of the proposed building (see Figure 15 and Table 1). The courtyard would have low winds and would be essentially calm. Point W would have moderate winds, and Point P winds would remain high.



**SANSOME**

**Ⓐ► WIND DIRECTION  
AT POINT A**  
  
**MAJOR FLOW**



## **PROPOSED SITE WIND FLOW PATTERNS**



**FIGURE 13**

#### E. SOUTHEAST WIND

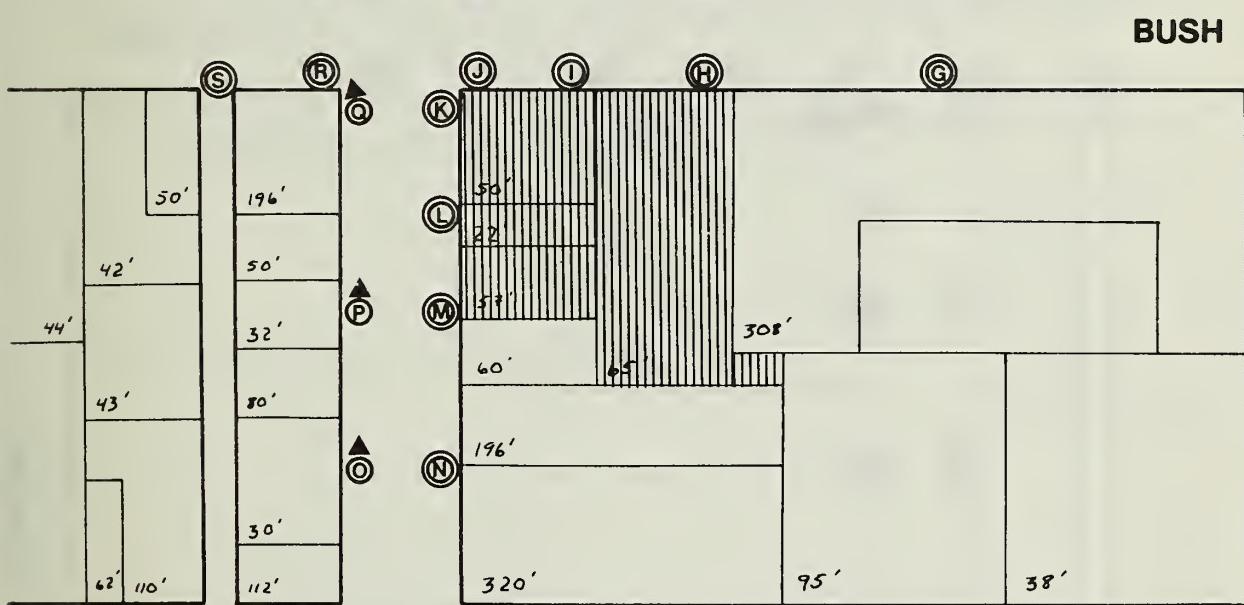
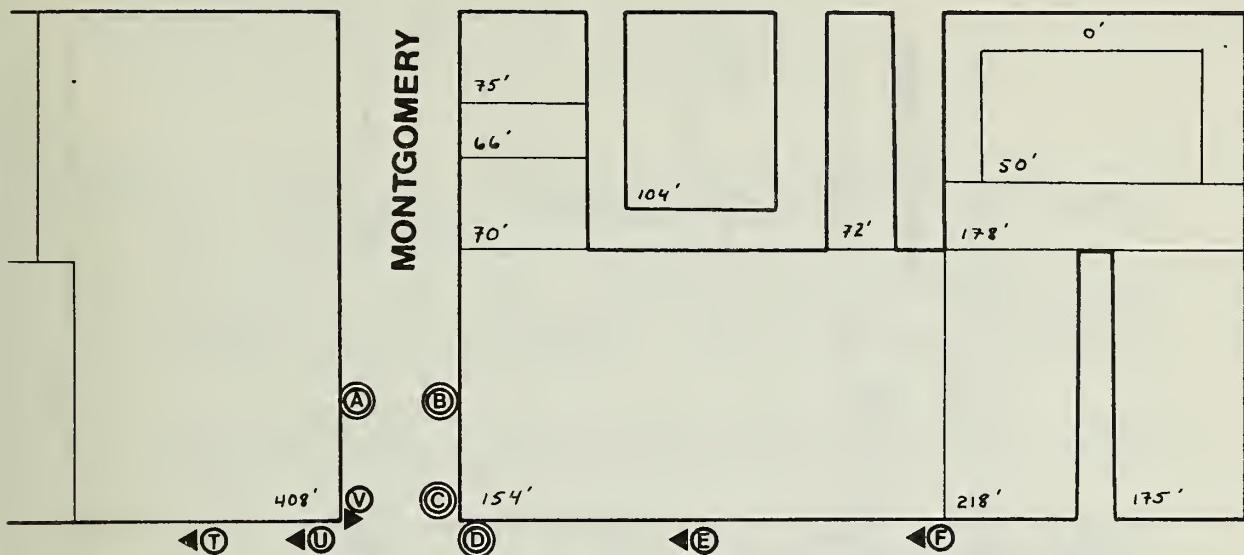
Southeast winds occur less than 3 percent of the time in spring and summer and 6 percent in fall. They are generally light during these seasons. In winter they can be expected 17 percent of the time, with speeds over 13 miles per hour 10 percent of the time.

##### Existing Site

Except for Point D, the site is basically calm (Figure 14), being protected by Financial District high-rises.

##### Site with Proposed Building

The site would remain calm after construction of the proposed building (see Figure 15 and Table 1). The courtyard would have low winds and would be essentially calm. Point W would have moderate winds, and Point P winds would remain high.



**SANSOME**

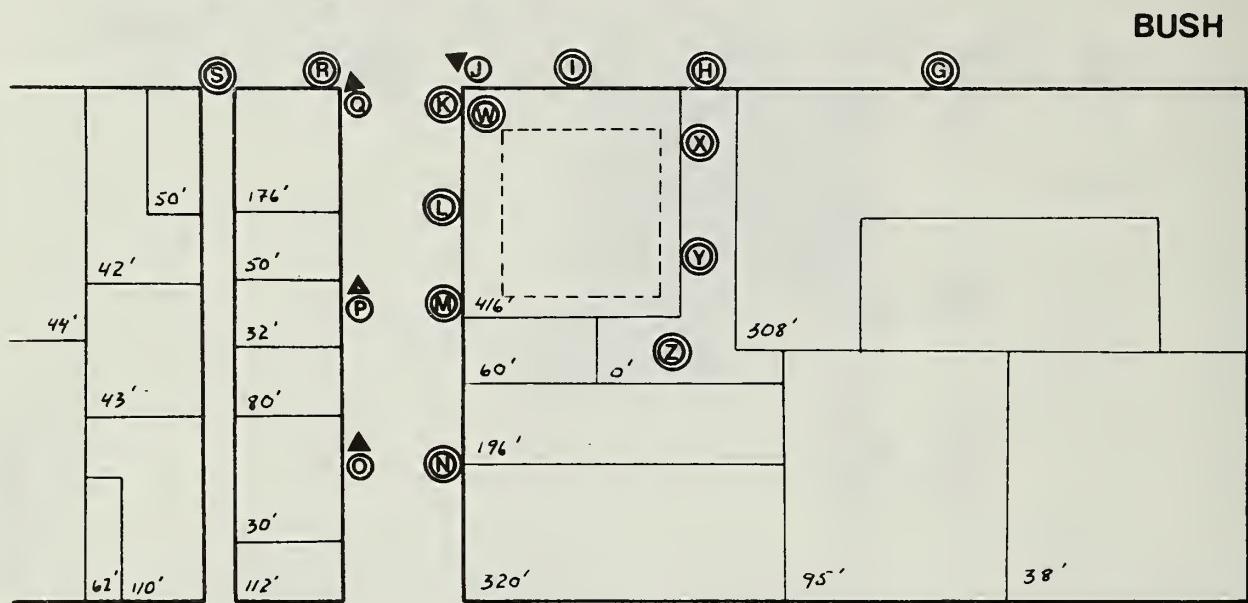
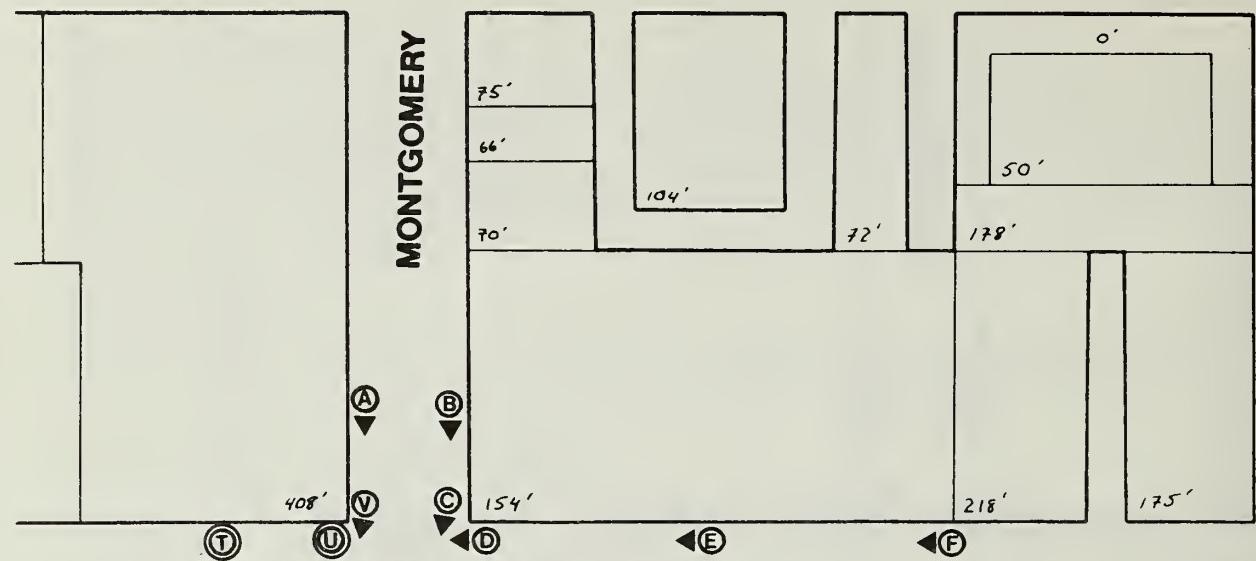
(A) ► WIND DIRECTION  
AT POINT A  
→ MAJOR FLOW



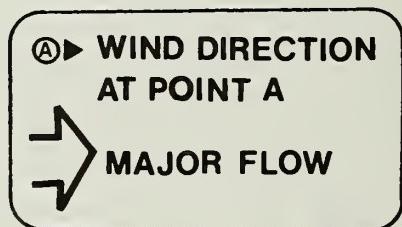
## EXISTING SITE WIND FLOW PATTERNS



FIGURE 14



**SUTTER**



## PROPOSED SITE WIND FLOW PATTERNS



FIGURE 15

## VIII. BIBLIOGRAPHY

Cermak, J. E., et al. Simulation of atmospheric motion by wind tunnel flows. Colorado State University, 1966.

\_\_\_\_\_, and S. P. Arya. "Problems of atmospheric shear flows and their laboratory simulation." Journal of Boundary-Layer Meteorology, 1970, September 1, 40-60.

Lloyd, A. "The generation of shear flow in a wind tunnel." Quarterly Journal of the Royal Meteorological Society, 93 (No. 395) 79-96 (1967).

San Francisco Department of City Planning. Final Environmental Impact Report, San Francisco Executive Park. EE 75-198, August 12, 1976.

U.S. Department of Commerce. Local climatological data, San Francisco Federal Building. 1970.

DELETE PAGES 187 THROUGH 189.

REPLACE WITH FOLLOWING TWO TABLES: PAGES 187 AND 188.

APPENDIX G

SKIDMORE, OWINGS & MERRILL  
ARCHITECTS - ENGINEERS

ENGINEERING DEPARTMENT CALCULATIONS

BUILDING PROPOSED HINES OFF. BLDG S.E.	MADE BY HJM	DATE 15 JUL 76	JOB NO 11437-6
SUBJECT MECHANICAL DATA FOR E.I.R.	CHECKED BY	DATE	SHEET NO. 1 OF 7

1. FOR COMPARATIVE DATA SEE ELECTRICAL DATA SHEET 1 OF 1
2. ESTIMATED ENERGY INPUT FOR FUEL OIL

a) AVERAGE FUEL OIL IN BTU PER SQ FT PER DAY

CAL 1ST BANK	CORR. FACTOR	CORR. FACTOR	CORR. FACTOR	TOTAL FOR
AREA	GAS TO OIL	TITLE 24	HINES	

$$100 \times 1.11 \times 1.11 \times 0.90 = 111$$

b) MAXIMUM PEAK FUEL OIL CONSUMPTION, BTU (MILLIONS)

CAL 1ST BANK	CORR. FACTOR	CORR. FACTOR	CORR. FACTOR
AREA	GAS TO OIL	TITLE 24	

$$6.5 \times 1.11 \times 1.11 \times 0.90 = 7.2$$

c) AVERAGE DAILY FUEL OIL CONSUMPTION, BTU (MILLIONS)

CAL 1ST BANK	CORR. FACTOR	CORR. FACTOR	CORR. FACTOR
AREA	GAS TO OIL	TITLE 24	

$$33 \times 1.11 \times 1.11 \times 0.90 = 36.6$$

d) AVERAGE ANNUAL FUEL OIL CONSUMPTION, BTU (BILLIONS)

CAL 1ST BANK	CORR. FACTOR	CORR. FACTOR	CORR. FACTOR
AREA	GAS TO OIL	TITLE 24	

$$12 \times 1.11 \times 1.11 \times 0.90 = 13.2$$

SKIDMORE, OWINGS & MERRILL  
ARCHITECTS - ENGINEERS

ENGINEERING DEPARTMENT CALCULATIONS

BUILDING	PROPOSED HINES OFF. BLDG S.F.	MADE BY HJM	DATE 15 JUL 76	JOB NO 11437-1
SUBJECT	MECHANICAL DATA FOR EIR	CHECKED BY	DATE	SHEET NO. 2 OF -

e) ENERGY REDUCTION FOR SUPPLY FANS - TITLE 24 HP

CAL 1ST BANK	CORR. FACTOR	CORR. FACTOR	TOTAL
AREA		TITLE 24	HP
400	X 1.27	0.80	406

DELETE

SKIDMORE, OWINGS & MERRILL  
ARCHITECTS - ENGINEERS

ENGINEERING DEPARTMENT CALCULATIONS

BUILDING PROPOSED HINES OFFICE BLDG., S.F. SUBJECT ELECTRICAL DATA FOR E.I.R.	MADE BY E.P.LEE DATE 7/14/76 CHECKED BY J.S. DATE 7/15/76	JOB NO. 11457 OCC SHEET NO. 1 OF 1
--	--	---------------------------------------

A. COMPARATIVE DATA:

	PROPOSED HINES BUILDING	CALIF. 1ST BANK	CORRECTIVE FACTOR
1. GROSS AREA:	386,100 S.F.	348,127 S.F.	+ 11%
2. NET RENT. AREA:	349,316 S.F.	247,441 S.F.	+ 27%
3. GROSS AREA PER FLO.: .	13,440 S.F.	15,485 S.F.	-
4. NO. OF TYP. FLO.: .	28	20	

B. ESTIMATED ELECTRICAL CONNECTED LOAD:

$$\begin{array}{l}
 \text{CAL. 1ST BANK} \quad \text{CORRECTIVE} \quad \text{ADJUST FOR TITLE 24} \quad \text{TOTAL FOR LINE} \\
 \downarrow \qquad \qquad \qquad \downarrow \qquad \qquad \qquad \downarrow \\
 \text{a) LIGHTING: } 1500 \text{ KW} \times 1.27\% \times 0.90\% = 1,710 \text{ KW} \\
 \downarrow \qquad \qquad \qquad \downarrow \\
 \text{b) OTHER LOAD: } 3000 \text{ KW} \times 1.27\% = 3,800 \text{ KW (FOR EQUIP., ETC.)} \\
 \downarrow \qquad \qquad \qquad \downarrow \\
 \text{c) TABULATION: } (1,710 \text{ KW}) + (3,800 \text{ KW}) = 5,510 \text{ KW TOTAL FOR HINES} \\
 \downarrow \\
 \text{d) ALLOWANCE FOR TITLE 24 ON MECHANICAL EQUIPMENT LOAD REDUCTION:} \\
 100 \text{ H.P.} \times 1.27\% = 127 \text{ H.P.} = 127 \text{ KW} \\
 \downarrow \\
 \therefore 5,510 \text{ KW} - 127 \text{ KW} = 5,383 \text{ KW; SAY } \underline{\underline{5,400 \text{ KW}}} \text{ GRAND TOTAL}
 \end{array}$$

6. ESTIMATED AVERAGE KWH USED PER MONTH: BASED ON 5.2 KWH/SS.FT.\*

- APPROXIMATED FROM DAILY DEMAND CURVE CHART FOR 24 HRS. = 24,300 KWH
- DAILY 24,300 KWH X 25 DAYS/MONTH = 620,000 KWH / Month

7. ESTIMATED AVERAGE KWH USED PER YEAR: 620,000 KWH X 12 = 7,440,000 KWH

8. ESTIMATED AVERAGE KWH USED PER MONTH PER SQ.FT.: 620,000 KWH ÷ 20,000 SQ.FT. = 11 KWH

\* DATA DERIVED FROM ACTUAL P.G.&E. CO. METER READINGS OF SEVERAL EXISTING LOCAL OFFICE BUILDINGS ADJUSTED FOR USE IN THIS PROJECT.

## APPENDIX G

ELECTRICAL ENERGY REQUIREMENTS  
(383,000 square foot gross)

	Diversity Factor	Average Demand (KWH)
Ceiling lighting-27,520 watts/floor/hr. (actual typical layout) x 31 floors	853.12	100% 853.12
Wall Plugs-15,300 watts/floor/hr. (actual typical floor layout) x 31	474.30	36% 173.88
Total lighting		1027.00
<u>1,027,000</u> <u>383,000 sq. ft.</u> = 2.68 watts/hr. per sq. ft. gross 2.68/.84 = 3.19 watts/hr. per sq. ft. net rentable		
(Within Title 24 requirements)		
Elevators - * 5 motors @ 28 HP ea. = 147.2 * 5 motors @ 42 HP ea. = 203.0 * 1 motor @ 20 HP = 19.9 * 1 motor @ 15 HP = 15.9	386.0 KW	* 30% 115.80 KW
* data from Otis Elevator Co.		
Plumbing pumps		
4 meters @ 15 HP ea. = 79.6 2 motors @ 7.5 ea. = 16.7	96.3 KW	50% 46.60 KW
(Lincoln Motor ratings)		
Total utility		162.40 KW
HVAC System		
2 chillers	201.0 KW	
2 condenser water pumps	48.3	
2 tower fans	38.2	
2 chilled water pumps	68.1	
2 hot water pumps	11.5	
15 air handlers	188.0	
72 fan-coils	27.1	
Miscellaneous	5.8	
2 air compressors	5.6	
4 exhaust fans	16.1	
Total HVAC electrical use	610.0 KW	
Grand Total	average KWH	1799.4

**B7  
BUILDING ENERGY SYSTEMS AND ECONOMIC ANALYSIS**

**INDICATED DESIGN VALUES ALTERNATIVE I**

**SYSTEM 2 (skin load)**

	DESIGN HEATING	DESIGN AIR DRY BUILDING	DESIGN COOLING - TONS	DESIGN CFM - TOTAL	DESIGN CFM - OUTSIDE AIR	DESIGN COOLING - TONS	DESIGN CFM - OUTSIDE AIR	DESIGN HEATING	DESIGN SUPPLY AIR DRY BUILDING	DESIGN SUPPLY AIR DRY BULB	DESIGN COOLING - TONS	DESIGN CFM - TOTAL	DESIGN CFM - OUTSIDE AIR	DESIGN COOLING - TONS	DESIGN CFM - TOTAL	DESIGN HEATING	
DESIgn CFH - TOTAL	4255461	90,89	4255461	4255461	0	5761	91	0	52000	52000	0	5131	0	5131	0	52000	
DESIGN CFH - OUTSIDE AIR	3937960	0	0	44220	0	1610	0	0	0	0	0	0	0	0	0	0	0
DESIGN COOLING - TONS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DESIGN CONDENSATE AIR	21278.31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DESIgn CFH - TOTAL	319596.08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**SYSTEM 1 (total load)**

	MONTHLY ENERGY CONSUMPTION												TOTAL SUMMER REQUIREMENT / YAH			TOTAL SUMMER REQUIREMENT = 383000.		
	ELEC			GAS			WATER			HEAT			CHIMNS			ELEC DEMAND		
	EAWH	THRMS	THRMS	EAWH	THRMS	THRMS	EAWH	THRMS	THRMS	EAWH	THRMS	EAWH	THRMS	EAWH	THRMS	EAWH		
JAN	398941.	0	0	5761	0	0	52000	0	0	4130	0	0	21550	0	0	21550	0	
FEB	3937960	0	0	44220	0	0	0	0	0	0	0	0	0	0	0	0	0	
MAR	4551760	0	0	48444	0	0	1810	0	0	1950	0	0	16140	0	0	16140	0	
APR	4015800	0	0	5556	0	0	3479	0	0	4130	0	0	21550	0	0	21550	0	
MAY	4465540	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
JUNE	4960230	0	0	16420	0	0	4130	0	0	4130	0	0	21550	0	0	21550	0	
JULY	4602420	0	0	0	0	0	1046	0	0	1110	0	0	0	0	0	0	0	
AUG	5441030	0	0	10620	0	0	6690	0	0	0	0	0	0	0	0	0	0	
SEPT	4581010	0	0	0	0	0	15220	0	0	1110	0	0	0	0	0	0	0	
OCT	5022300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
NOV	4136920	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
DEC	3963140	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL	5383460	0	0	0	0	0	38200	0	0	0	0	0	0	0	0	0	0	
ENTIRE CONSUMPTION =	57901	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	





